

WARM AIR HEATER SPECIAL

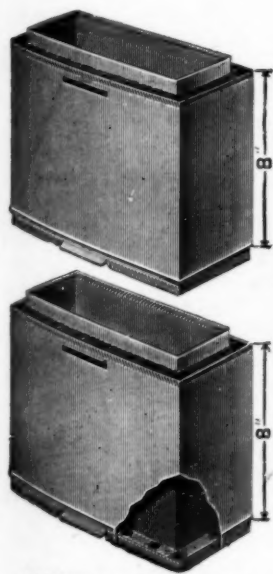
AMERICAN ARTISAN and Hardware Record

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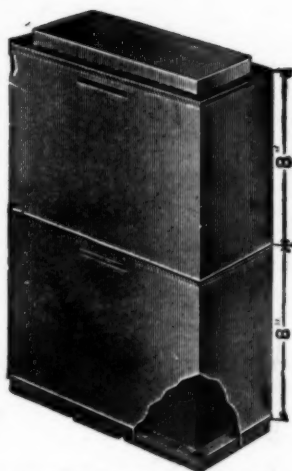
620 SOUTH MICHIGAN AVENUE, CHICAGO, DECEMBER 6, 1919.

\$2.00 Per Year.

MICHIGAN SAFETY FURNACE PIPE



MICHIGAN SAFETY
FURNACE PIPE
Ready to Connect.



MICHIGAN SAFETY
FURNACE PIPE Locked
Making Air Tight Joint.

ASSURE your customers of complete safety on every installation job that you have. Use MICHIGAN SAFETY FURNACE PIPE.

Note these safety features:

1. The air chamber between the inner and outer pipe, maintained by a perforated spacing collar.
2. Short joints which enables the most crooked stack to be made without cutting or destroying the safety features.
3. Every joint and piece fits into the others perfectly which makes the completed stack smooth and straight both inside and outside.
4. MICHIGAN SAFETY FURNACE PIPE is made from the best grade of bright tin plate by special machinery. No rivets or solder are used.

Notice the illustrations. You can see every feature. Features that save you money and time.

FOR YOUR BIG BUSINESS THIS SEASON

Use MICHIGAN SAFETY FURNACE PIPE. With the rush that you are experiencing you cannot afford to waste any time with faulty furnace pipe. Neither can you afford to give your new customers anything but the best. The safety features of MICHIGAN SAFETY FURNACE PIPE will appeal to your customers. As it costs you no more than any other kinds it will cost them no more and besides you can do a better and quicker job. **Get a stock in now.**

Write today for prices and catalog

MICHIGAN SAFETY FURNACE PIPE COMPANY

113-115 East Fort Street, DETROIT, MICHIGAN

A Profitable Seller for RIGHT NOW
Durable, Economical and Efficient

DANGLER

Wickless Blue Flame Oil Burning Water Heater

THE result of years of experience in the manufacture of Wickless Oil Stoves. It embodies all that is practical in modern Water Heater building. Mounted as it is on long legs, at the proper height for connection to boiler, its convenience in operation is readily apparent.

The **DANGLER Wickless Blue Flame Oil Burning Water Heater** is fitted with two powerful wickless oil burners, the same as used in **DANGLER Oil Cook Stoves** for the past twenty-five years. The double seamless copper coils, fitted with brass connections, are placed to receive the full volume of heat, thus insuring a minimum operating expense.

*One or two burners may be used
as desired with good results.*

The **DANGLER Oil Burning Water Heater** is protected with a double casing, asbestos lined, which retains all the heat and prevents radiation. This is a feature that your customers will appreciate during the summer months. Note from the illustration the large door extending from the top to the bottom which makes the coils and burners easily accessible for cleaning and inspection. The base is surrounded with a specially built pan to provide for any possible sweating or dropping of carbon from the burners.



No. 60 WICKLESS OIL WATER HEATER
FRONT VIEW SHOWING COILS AND BURNERS

Place a DANGLER Wickless Oil Water Heater on your floor NOW

Put one on display in your store and let it sell itself. Its neat appearance and sturdy construction appeal at once to all who see it. The **DANGLER Wickless Blue Flame Oil Burning Water Heater's** superiority over any heater of its kind is acknowledged wherever the **DANGLER** is sold or used. Study the **DANGLER Oil Water Heater** in detail; it is 42 inches in height from top to bottom, the legs measure 18 inches in height, the base is $8\frac{1}{4} \times 14\frac{3}{4}$ inches, door opening is 7×16 inches, the flue collar measures 3 inches, and the water connections $\frac{3}{4}$ inches. The oil tank has a capacity of 5 pints. The outside frame is made of 24-gauge steel, lined with $\frac{3}{16}$ in. asbestos, covered with 26 gauge steel. Each coil is made of $10\frac{1}{2}$ feet of the highest grade 18 gauge $\frac{3}{4}$ in. seamless copper tubing. Crated weight is 55 lbs.

Write today Mr. Dealer and start selling the DANGLER Wickless Blue Flame Oil Burning Water Heater in your territory RIGHT NOW. Catalogs and circulars sent on request, send a postcard for them today

DANGLER STOVE COMPANY

DIV. AMERICAN STOVE CO.
CLEVELAND, OHIO

PHILADELPHIA, PA., 131 Market St.

SAN FRANCISCO, CAL., 718 Mission St.

LOS ANGELES, CAL., 804 Higgins Bldg.

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CHICAGO, DECEMBER 6, 1919.

\$2.00 Per Year.

IN SPITE OF the economic upheavals of war and the rising tide of prices of labor and material, the warm air heater industry has made noteworthy progress

Reviews during the year which is drawing to a
Warm Air close. Seen in perspective from the van-
Heating tage point of a general summary of the
Industry. industry's activities, there are many rea-
sons for believing in a continuance of the prevailing
prosperity. Encouragement is given those who are
doubtful regarding the outlook and corroboration is
afforded those who take an optimistic view of the
prospects by the summary of conditions and tenden-
cies set forth in the annual review of the warm
heater industry in this issue of AMERICAN ARTISAN
AND HARDWARE RECORD. Without exception, all the
reports from manufacturers, jobbers, dealers, and in-
stallers, indicate a big increase of business over that
of the preceding year. Great strides have been made
along educational lines. Quite a number of manu-
facturers express themselves in favor of a cooperative
advertising campaign, having for its purpose the edu-
cation of the people with reference to the superior
advantages of warm air heating. Collective pub-
licity has been tried with satisfactory results, notably
by the Roofing, Metal, and Heating Engineers of
Philadelphia, Pennsylvania, in a campaign for in-
structing the public as to the merits of the warm air
heater.

The way has been opened to the solution of many
of the scientific problems involved in warm air heat-
ing. A Bureau of Research has been established by
the American Society of Heating and Ventilating En-
gineers at the Laboratory of the United States Bureau
of Mines, Pittsburgh, Pennsylvania. It is under the
direction of Professor John R. Allen. Professor Al-
len is well known for his research work in heat en-
gineering at both the University of Michigan, where he
served many years as Professor of Mechanical En-
gineering, and at the University of Minnesota, where
he was Dean of the College of Engineering and Archi-
tecture. The Research Bureau at Pittsburgh is en-
gaged in the collection of all existing data and rec-
ords and the standardization of all instruments and
methods of testing.

In cooperation with the Engineering Experiment
Station of the University of Illinois, at Urbana,
Illinois, the National Warm Air Heating and Ventilat-
ing Association is carrying on exhaustive research
work in warm air heating. The experiments are con-
ducted under the general supervision of A. C. Willard,
Professor of Heating and Ventilation, University of

Illinois. A permanent staff of at least three men is
constantly employed in the investigations. Professor
A. P. Kratz is Research Assistant, V. S. Day is
Research Assistant, and Ward E. Pratt, Research
Associate of the University in working out problems
connected with the installation and operation of warm
air heaters. In another part of this issue of
AMERICAN ARTISAN AND HARDWARE RECORD are pub-
lished instructive papers by all these experts.

Practically all of the manufacturers and installers
are agreed upon the sufficiency of cold air intake from
the floors of the dwelling, being thus in accord with
the recommendation of the United States Government
experts on this question. Some diversity of opinion
obtains with reference to State laws governing instal-
lation. The preponderance of views as to the licensing
of installers by the State does not favor such a proced-
ure. Most of the manufacturers and installers fear
the evil influence of partisan politics in the adminis-
tration of such a law. They believe that more positive
results can be accomplished by education rather than
by legislation. In this belief they are supported by the
facts of experience going to show that there has been
a very noticeable decrease of defective installations
throughout the country.

The violent swinging of the pendulum of opinion
with respect to the pipeless warm air heater is grad-
ually changing to a normal oscillation. Exaggerations
are disappearing. The trade is coming to the place
where a sane estimate of the limitations of the pipeless
warm air heater is being generally accepted. It has
developed that the opposition to the pipeless warm air
heater has been caused not by any lack of heating
value in this type of warm air heater, but by the unre-
strained enthusiasm of its pioneer promoters. A defi-
nite position of service has been reached by the pipe-
less warm air heater, and its limitations are now gen-
erally understood. The consensus of the trade is that
the pipeless warm air heater in proper circumstances
will not injure the interests of the industry. It is
vastly superior to stoves for heating purposes and is
especially adapted for use in bungalows and buildings
where there is sufficient openings between rooms.

Much has been accomplished during the year in the
way of cooperative educational work by the National
Warm Air Heating and Ventilating Association. This
organization is lending the power of its influence to
the scientific investigations which are being carried
on at the University of Illinois for the betterment of
warm air heater production and design. The Associa-
tion is also thoroughly in harmony with the Research

Bureau of the American Society of Heating and Ventilating Engineers at the United States Bureau of Mines in Pittsburgh. A large percentage of sheet metal contractors throughout the country are engaged in business of selling and installing warm air heaters. Consequently, there is a bond of interest between their organization, namely, the National Sheet Metal Contractors' Association, and that of the manufacturers, the National Warm Air Heating and Ventilating Association. Both bodies are earnestly endeavoring to advance the general level of efficiency among the members. Without boasting, AMERICAN ARTISAN AND HARDWARE RECORD may rightly claim to have been instrumental in promoting higher standards in the industry and in spreading the doctrine of cooperation. Recognition of its labors in this direction has been given generous expression from every quarter. It is with a sense of having sincerely worked to merit these commendations that acknowledgment of them is hereby made.

IT IS A SIGNIFICANT fact that science did not emerge from the cloisters of the Schoolmen until the demands of industry called it forth. Modern chemistry received its initial impulse about the time of the invention of the spinning jenny. The manufacture of cotton textiles upon a vast scale necessitated more economical methods of bleaching than those which had been brought to England from India. Accordingly, chemists began to experiment. The great French scientist, Claude Louis Berthollet, made his famous investigations in the chlorine group and evolved the first commercially practical bleach. Without exaggeration, therefore, it may be said that chemistry as we know it today owes its origin to the necessities of industry. During the long centuries of the Alchemists the laboratories of the world were merely places for dreamers who sought the Philosopher's Stone. They were actuated by visions of fabulous wealth which would come to the fortunate one who discovered the magic by which to transmute the baser metals into gold. When feudalism disappeared and the era of machine production began, science awoke from its dreams of the impossible and turned to the service of the people.

It is in fulfillment of the traditions of such pioneers as Berthollet, that scientists are searching out the secrets of nature for the comfort, betterment, and culture of humanity. An unwritten code, more sacred than the oath of Æsculapius, guides the scientists of today in their studies and keeps them free from the trickery and deceit which stain the history of the Alchemists. Although they are in the service of commerce yet they are singularly free from the influence of commercialism. And so the work of the scientific men at the Engineering Experiment Station University of Illinois, Urbana, Illinois, and at the Heating and Ventilating Engineers' Research Bureau in Pittsburgh, Pennsylvania, who are carrying on investigations of warm air heaters, is for the benefit of the entire industry and not for the aggrandizement of any particular manufacturer.

Some very startling results have recently been achieved at the Engineering Experiment Station of the University of Illinois. They will cause a radical

change to be made in generally accepted principles regarding warm air heater fittings and installation. A bulletin is soon to be issued by the University of Illinois giving an account of these sensational discoveries which will prove astounding to warm air heater manufacturers and to the trade in general. The bulletin will be published in an early issue of AMERICAN ARTISAN AND HARDWARE RECORD. As soon as the bulletin is ready for distribution copies of it may be had from Allen W. Williams, Secretary National Warm Air Heating and Ventilating Association, Columbia Building, Columbus, Ohio. It is the conviction of those who have been privileged to become acquainted in advance with a synopsis of the discoveries that they furnish overwhelming proof of the practical value of the research work carried on at the University of Illinois.

THOUGHTS ARE THE tools of actions. Wrong ideas produce wrong deeds. A twisted notion of freedom results in things harmful to society. We need a correct conception of liberty today upon which to shape the industrial readjustments made imperative by the European war. No greater service can be performed in this connection than to repeat and spread widecast the wholesome words of Lincoln. He said:

**Lincoln's
Definition
Of Liberty.**

"The world has never had a good definition of the word liberty and the American people are just now much in need of one. We all declare for liberty, but in using the same word we do not all mean the same thing. With some the word liberty may mean for each man to do as he pleases with himself and the product of his labor, while with others the same word may mean for some men to do as they please with other men and the products of other men's labor. The shepherd drives the wolf from the sheep's throat, for which the sheep thanks the shepherd as his liberator, while the wolf denounces him for the same act as the destroyer of liberty. Plainly the sheep and the wolf are not agreed upon a definition of the word liberty and precisely the same difference prevails today among us human creatures."

The old phrases have lost the sharpness of their edge. The contrasting of liberty and license may do well enough as an exercise in rhetoric. It does not serve, however, to bring into focus the multiple details of the principle of liberty. What is needed is some familiar word of the day which will help us get at the pith and marrow of the thing which we call liberty. In more or less vague form there is a concept of it in every mind. This differs in non-essentials according to individual interest and local traditions. The great mass of the people, however, would agree in accepting liberty as signifying cooperation for the common good rather than as a set of legal instruments for the safeguarding of property rights and freedom of action within bounds set by statutory enactments. In America, we are members all of the same republic. The comfort and well being of the citizens of this republic can be promoted by a working together of all. Liberty and Americanism are interchangeable words. Liberty is equal opportunity, and the elimination of special privileges.

RANDOM NOTES AND SKETCHES.

By Sidney Arnold.

What we call thrift in ourselves is sometimes stinginess in others, says my friend E. C. Fox of the Independent Register and Manufacturing Company, Cleveland, Ohio. He cites the example of the lady who called at the butcher's shop in the country town and asked for a very small portion of goods, including a nickel's worth of cat meat. The butcher was muttering angry words to himself a half-hour later, as he made up the order, when a flurried and breathless maid servant dashed into the place.

"Have you sent off Mrs. Grableigh's things yet?" she gasped.

"Just doin' 'em," snapped the man.

"Oh, thank goodness!" exclaimed the girl. "Then don't send the cat's meat. The cat has just caught a sparrow."

* * *

Embarrassment often comes from taking words in their literal sense, declares my friend E. P. Miller of the Lennox Furnace Company, Marshalltown, Iowa, as in the case of the schoolmaster who ordered Willie Brown to bring the number of his house to school.

"Well, Willie," he inquired, "have you brought the number of your house?"

"Yes, sir," Willie answered, "I've got it; but I had a hard job to get it off—it was nailed on so tight."

* * *

My friend E. B. Langenberg of the Haynes-Langenberg Manufacturing Company, St. Louis, Missouri, tells about a lawyer who was quite ill. A doctor was summoned, but as soon as he arrived and got one look at his patient, he said:

"Sorry, but you'll have to call another doctor."

"Am I as sick as all that?" gasped the attorney.

"No, but you're the lawyer that cross-examined me when I was called to give expert testimony in a certain case. Now my conscience won't permit me to kill you, but I'm darned if I care to cure you. Good day."

* * *

Talking about the innocent bystander getting the worst of it, my friend William Covert of Schill Brothers Company, Crestline, Ohio, recalls the case of a fond mother who, on entering her little boy in a new school, said to the teacher:

"Algernon is delicate and so if he is bad—and he will be bad sometimes—just lick the boy next to him and that will frighten him into good behavior."

* * *

Experts in child culture speak learnedly of the importance of patience in answering questions propounded by children. My friend David M. Haines, President Chicago Sheet Metal Contractors' Association, Chicago, Illinois, says that he thinks that few of the experts observe their own teachings to the letter. Indeed, he is quite certain that they would act in very much the same way in similar circumstances as a neighbor of his whose nerves sometimes become frazzled under questions from his talkative eight year old son.

"Dad," said the youngster, just as the old man set-

tled down for a perusal of his newspaper, "Dad, am I made of dust?"

"I think not," responded the unhappy parent, "otherwise you would dry up once in a while."

* * *

The servant problem is one of the perplexities of the times. Its difficulties are occasionally increased by women of the type in this story told me by my friend, George R. Carter, of Cope-Swift Company, Detroit, Michigan:

Lady (at a servants' employment office)—"Now, I want a girl who will be able to think for herself; one that I won't have to watch and correct every minute of the day. I want one in whom I can repose perfect confidence, sure that she will get the meals at the time and in the way I like them. I want a cook—"

Manager—"Excuse me, ma'm, but you don't want a cook. What you want is a fairy godmother!"

* * *

My Old Guard friend, Frank Harrison of Harrisonburg, Virginia, tells about a bachelor who attended a wedding breakfast.

"The single man is worse off than the married man," said the bachelor.

"But how is it that you think this?" pointedly asked the woman.

"Well," he explained, "you see, the married man fears only one woman, while the single man fears them all."

* * *

My Old Guard friend, General Irby Bennett, of Memphis, Tennessee, declares that one of the secrets of successful business is to know when to avoid asking questions. He illustrates his meaning with this significant dialogue:

"Are caterpillars good to eat?" asked little Tommy at the dinner table.

"No," said his father; "what makes you ask a question like that while we are eating?"

"You had one on your lettuce, but it's gone now," replied Tommy.

* * *

Measured by the Abbé Roux's definition of poetry as "the exquisite expression of exquisite impression," the following verses are the merest doggerel. I am not quoting them, therefore, for any daintiness of diction, but because they convey a message which deserves to be repeated. I suppose that in the staunchest nature there is an occasional impulse to quit the task in the face of difficulty. We all need the reminder that braces us up and spurs us to play the game to the end.

The Quitter.

It ain't the failures he may meet
That keeps a man from winning;
It's the discouragement complete
That blocks a new beginning;
You want to quit your habits bad;
And when the shadows flittin'
Make life seem worthless like an' sad,
You wan't to quit your quittin'.

Although the game seems rather stiff,
Don't be a doleful doubter;
There's always one more inning if
You're not a down-and-outer.
But fortune's pretty sure to flee
From folks content with sittin'
Around an' saying life's N. G.—
You've got to quit your quittin'.

AMERICAN ARTISAN

HERMAN WALTER SIGRIST.

The eyes of a man reveal him. They constitute a medium of expression more subtle and eloquent than articulate speech. It is possible to control every other feature of one's countenance for the concealment of thought. But the eyes are never reticent. They are the open laboratory into which the raw materials of ideas and fancies are brought from the outer world. The mind works therein without subterfuge. Indeed, scientists tell us that in the iris of the eye, that is, the colored circle around the pupil, can be read the condition of every organ of the body in health or disease. Love, hatred, guile, simplicity, anger, ambition, generosity, hope, despair—every emotion and nerve-stirring flash their significance through the human eye. There is still the tradition among the peasantry of the old world countries of the evil eye and its terrible power to work disaster in the affairs of man and beast. Its converse needs no superstition. The good eye, the kindly eye, has a white magic all its own. It beams forth good cheer, whether from the face of a shepherd herding his flocks along a hillside or a manufacturer holding a conference for the betterment of his business.

Strangers feel at home with Herman W. Sigrist because his eyes invite confidence and radiate kindness. In these days of ponderous psychoanalysis, it seems almost a childish thing to measure the character of a man by the expression of his eyes. Yet, those who have known Mr. Sigrist from his boyhood say that his eyes have always spoken truth and good fellowship. Always they have been frank. Whatever glints of shrewdness show in them now and then are not the cunning of a schemer, but the cleverness of a man of affairs who knows how to plan and execute enterprises of value to himself and his associates.

The eyes change as the character changes. If they continue to be benignant and tranquil it is because the person gathers wisdom and forbearance with the passing years. The pleasant eyes of Herman W. Sigrist tell the story of development along lines of tranquillity in which there are no twists or crooked turns. They are still the eyes of his boyhood days in Brighton, Indiana, where he was born March 31, 1882.

He was educated in the Grammar and High School in Howe, Indiana, and at the Tri-State Normal College at Angola, Indiana. After his graduation, he entered real estate business and building. He was not satisfied with merely buying and selling or negotiating real estate transactions. He took a profound interest in the home aspect of real estate. To him it presented itself in terms of comfort, of laughing children's voices, of romance, and solace. It was during his connection with this business that he paid special attention to the warm air heater as the means of making the home cozy and inviting.

His studies convinced him that the warm air heater is the most practical and satisfactory device for main-

taining healthful and comfortable temperature in the home. He approached the subject with an open mind. He had no prejudices to overcome. Early in his investigations he perceived the disadvantages of both steam and hot water systems of heating for the average dwelling. He learned that it is practically impossible to secure the proper degree of humidity in houses heated by either of these systems. It is true that some degree of moisture can be obtained for the atmosphere of the home from the use of evaporating pans attached to the radiators in steam or hot water systems. But these are clumsy devices which detract from the appearance of the room and in the vast majority of cases are neglected. On

the other hand, the water pan set in the casing of the warm air heater or—what is still better—an automatic humidifier is almost certain to receive periodical attention from the householder when he goes down to replenish the fuel in his warm air heater.

It was only natural, therefore, that eventually he should drift into the warm air heater business. Wherefore, in 1913, we find him in the position of General Manager of the Modern Way Furnace Company, Fort Wayne, Indiana. He performs the duties of the office with a friendliness which attracts and holds customers for the Modern Way Furnace Company. His chief diversion is fishing—a sport which requires a placid mind. He belongs to the Kiwanis Club and is a member of the Masonic Fraternity.



HALL OF FAME

JOHN V. PATTEN.

There is truth in mythology. Fables are wisdom in the guise of fancy. So in the myth of Antæus is the lesson of the wholesomeness of the soil. Antæus was said to renew his strength every time he touched the earth. The lesson might be phrased in more prosaic language. It is doubtful, however, if its underlying facts thus would be more persuasive. We are all earth folk. The strength of us is out of the soil. The strong men of our nation are men who have tilled the fields and garnered the harvests. The very prototype of all that is best in Americanism is Abraham Lincoln. He remained close to the things of the soil till the end. More than once in the evolution of civilization great leaders, as Cincinnatus in the old Roman days, have been called from the plow to the councils of state. People who come direct from the land have sturdy principles. They know the value of toil. They have learned to earn the right to live by the exercise of brain and brawn. Their instincts are more highly developed than those of urban dwellers. Wherefore, they are quicker to detect pretense and false ideas.

An endowment of this kind is a possession not transmitted from fortunate ancestors but won by dint of personal striving. In this respect John V. Patten, President of the Hero Furnace Company, Chicago, Illinois, has an advantage which is more to be desired than much gold and many precious stones. He comes from the soil. His early years were spent in close touch with the brawny workers of the fields. He was born at Silver Lake, Kansas, March 5, 1875, and acquired his education in the grammar school at that place. Subsequently, he attended the Kansas State Agricultural College at Manhattan, Kansas. The training which he received there was of great service to him. Through it he was enabled to visualize some of the tremendous possibilities of knowledge as applied to the fundamentals of life. He found that science when united with effort overcomes centuries of ignorance and incompetence. The dull plodding and back breaking labor, with its comparatively meagre returns, have been changed through the agency of technical educa-

tion to relatively easy toil and greater yields with ever increasing mechanical comforts.

After his graduation from the Kansas State Agricultural College, John V. Patten taught a number of rural schools in Kansas. He entered the profession of teaching not merely for the purpose of gaining a livelihood, but because the work was congenial to him. He counts as among the most valuable of his possessions today the experience of those years. He profited by the opportunities which it afforded to study human nature in its formative period. It is reported that he was a good teacher because he was a close student of character, and because he formed and carried out the purpose of training his pupils to think for themselves rather than to commit to memory the lessons of their text books.

His leisure hours were spent in reading and studying a wide range of subjects. He took a special interest in things mechanical. Thus it came to pass that he made up his mind to leave the profession of teaching and engage in industrial production. Accordingly, in 1898 he entered a foundry at Sycamore, Illinois, and spent two years in obtaining practical knowledge of foundry technique with special reference to the manufacture of warm air heating apparatus. In 1900 he became associated with the Charles Smith Company, of Chicago, Illinois, manufacturers of the Hero warm air heaters, as



Secretary and Treasurer. In 1912, he was selected to become President of that Company. Five years later, in 1917, when the Charles Smith Company was reorganized as the Hero Furnace Company, he was chosen as President of the new corporation. He finds pleasure in business because it affords him the means for the application of knowledge. Occasionally he indulges in a game of golf or lawn tennis. He is active in Masonic circles and is a member of Siloam Commandery, and was recently elected Treasurer and member of the Board of Governors of the Hardware Club of Chicago. To use a homely phrase, there is not a lazy bone in his body. He never shirks responsibility or delegates to others work he can best do himself.

UP TO THE MINUTE NEWS SIFTINGS

STOVE FOUNDERS AND MOLDERS ARE HOLDING ANNUAL CONFERENCE.

The annual conference for dealing with wages and working conditions is now going on at Atlantic City, New Jersey, between a committee of the Stove Founders' National Defense Association and a committee of the International Molders' Union of North America. The issues involved require careful deliberation. The well-being of the industry, both from the angle of the employers and of the workers, is the motive uppermost in the minds of the men engaged in the conference. No definite agreements have been reached up to the time of going to press of this issue of AMERICAN ARTISAN AND HARDWARE RECORD. Judging from past achievements of the conferences held by these two organizations, the inference is warranted that satisfactory adjustments of whatever difficulties are presented will be reached by the representatives now in session at Atlantic City.

ANNOUNCES TWENTY-SECOND ANNUAL RECEPTION AND BANQUET.

On Wednesday evening, December 17, 1919, the Stove Salesmen's Association of Pennsylvania will celebrate its twenty-second Annual Reception and Banquet at the Hotel Walton, Philadelphia, Pennsylvania. For twenty-two years the members of this organization have looked forward to this annual event as a time to renew their good fellowship and pleasant relations with their brother salesmen. In times of rapid business development, illustrated by the economic readjustment now going on, an exchange of views with those related in business is unusually enlightening. The Annual Reception and Banquet of The Stove Salesmen's Association of Pennsylvania offers the opportunity for this intercourse. Tickets to this Banquet can be obtained from James McGaw, Secretary of the Stove Salesmen's Association of Pennsylvania, 2223 Cumberland Street, Philadelphia, Pennsylvania.

THE NEW INTERNATIONAL CHAMBER OF COMMERCE WILL MEET IN PARIS.

As an outcome of the International Trade Conference held in Atlantic City, New Jersey, during October, 1919, an organization has been formed to be known as the International Chamber of Commerce. The first meeting of the new chamber will be held at Paris, France, in June, 1920. There will be named at once a general organizing committee of 25, with five members from each country participating in the conferences. John H. Fahey of Boston will be chairman. American members will be named by the Cham-

ber of Commerce of the United States. Each country's representative will form a bureau to carry on the work. The full organization committee will meet in Paris a month in advance of the June meeting to arrange for the conference. At this session a final draft of a constitution will be recommended. There will be a permanent headquarters in Europe with a board of directors and a secretary-general, and each country will be represented at headquarters by an executive and a technical staff. In each country there will be also a national bureau.

International meetings will be held every two years. The board of directors, with two members from each country, will meet every year. There will be a referendum system by which organizations in every country can express their ideas on questions that come before the international organization.

EFFICIENTLY SUPPLIES HOT WATER.

In the illustration herewith is depicted a device for which there is a sharp demand. The Number 60



№ 60
Dangler
Wickless Oil
Burning
Water Heater,
Made by the
Dangler Stove
Company,
Cleveland, Ohio.

Dangler Wickless Oil Burning Water Heater, shown herewith, manufactured by the Dangler Stove Company, Division American Stove Company, Cleveland, Ohio, is the result of years of experience. This wa-

ter heater is neat and plain in design. It is built to meet the need for an adequate supply of hot water. To enable proper connections with boilers, the Dangler Wickless Oil Burning Water Heater is built on high legs. Operation of this water heater is also rendered convenient by this arrangement. Two powerful wickless oil burners of the type used in the Dangler Oil Cook Stoves for the past twenty-five years supply the heat. Double seamless copper coils, fitted with brass connections, are installed in the Dangler Wickless Oil Burning Water Heater. The position of these coils is such that they receive the full volume of heat generated by the burners. When a lesser amount of hot water is required, one burner will be found satisfactory for the purpose. Other details as interesting as those described herein are contained in the catalogues of the manufacturers. Write to the Dangler Stove Company, Cleveland, Ohio, for details concerning agency for this product and for a set of their catalogues.

BUSINESS MEN COMPOSE PLATFORM FOR TRUTHFUL ADVERTISING.

Every business man who desires to build for permanency will be interested in a movement by Baltimore business men whereby they hope, through discovering and classifying the pitfalls that lead to advertising misstatements, to prevent advertising untruths and advertising half truths such as are so destructive of business good will, declares the Associated Advertising Clubs of the World.

The Baltimore Platform for Truthful Advertising, recently issued by the Vigilance Committee of the Advertising Club of Baltimore is important because it is in reality not merely a document that has been written by the committee. It has been produced by the action and daily practice of the better class and more successful merchants of Baltimore. "How to Apply Truth in Advertising" is the title of the document, which is as follows:

"The basic principle of advertising is truth. And by truth is meant the statement of all the important facts regarding the article advertised, without the suppression of any detail which, if omitted, would tend to make the article seem more desirable than it really is.

"Truthful advertising, therefore, must be prepared with careful reference to the following points:

The Origin of the Merchandise.

"'Special Purchase' must not be used unless the merchandise has been bought at less than the usual price. 'Overstock,' 'Clearance,' 'Remnants,' and similar expressions, must be used only when they represent the exact facts in the case. If some of the advertisers' own merchandise is included in a sale of specially purchased goods, this fact should be noted.

The Description of the Merchandise.

"Size and colors should always be given with absolute accuracy. Expressions like 'all the wanted shades,' when the assortment may include only five or six shades in all, should be tabooed. If the merchandise is slightly defective, the expression 'seconds,' 'slightly imperfect,' or 'run of the mill' should be

given a prominent place in the description. Merchandise which is old or out of style should not be represented as new and fashionable. Quantities should always be indicated. If a small lot, the advertisement should so state.

The Value of the Merchandise.

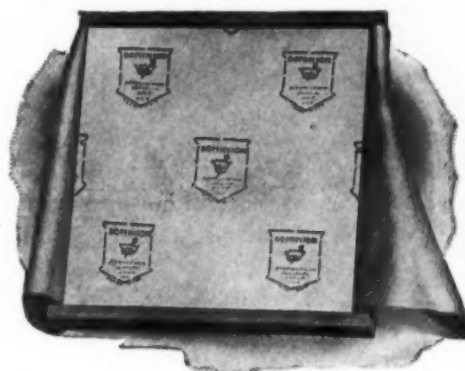
"Comparative values have no place in truthful advertising. By comparative values is meant the statement that an article is 'worth' a price in excess of the selling price. Such statements of worth are usually the optimistic opinion of the one man or woman who bought the merchandise, and are usually exaggerated. Where an article, up to the time immediately prior to the appearance of the advertisement, has been selling in the advertiser's regular stock, at a higher price, it is entirely permissible to mention this. Such a statement is a fact, and capable of being verified. The use of a comparative price several months old, however, is likely to be misleading and should be avoided.

The Use of Trade Names.

"There are a number of articles which bear misleading trade names. For instance, Spanish leather, which is neither Spanish nor leather, Palmer Linen, which is all-cotton, Hudson Seal, which is not seal, but dyed muskrat; and so the use of these names should be avoided. In cases where fabrics are part silk and part cotton, or part cotton and part wool, this fact should be prominently mentioned in the description. Such expressions as 'Crepe de Chine,' for a part-cotton fabric, 'Wool Underwear,' for wool-and-cotton underwear, 'Linen Table Damask,' for half-linen and half-cotton damask, should not be tolerated.

HAS HIGH PERCENTAGE OF ASBESTOS.

An asbestos packing of unusual quality and utility is manufactured by the Dominion Asbestos and Rubber Corporation of New York City.



Dominion Asbestos Millboard, Made by the Dominion Asbestos and Rubber Corporation, New York City.

ber Corporation of New York City. In the accompanying illustration is shown a layer of Dominion Asbestos Millboard.

Ninety-two and ninety-seven per cent of this

material is pure asbestos. It is said that the average asbestos millboard is cheapened with paper stock and is colored with a high content of white organic or mineral fillers. According to the manufacturers of this product, fire-proofing qualities and ability to carry in stock are not sacrificed in the manufacture of Dominion Asbestos Millboard for color and cheapness. As a guarantee of quality, each sheet is branded. Put up in standard, heavy crates, Dominion Asbestos Millboard is warranted to reach destination with contents in good condition. This product has many uses. A letter to the Dominion Asbestos and Rubber Corporation, 154 Nassau Street, New York City, concerning their products will be promptly answered.

THE WEEK'S HARDWARE RECORD

Of Interest to Manufacturer, Jobber and Retailer

AMERICAN ARTISAN AND HARDWARE RECORD is the only publication containing western hardware and metal prices corrected weekly. You will find these on pages 38 to 43 inclusive.

Haage Brothers Company are occupying their new factory building in East Peoria, Illinois. They are manufacturers of washing machines and have a largely increased capacity.

Altorfer Brothers Company, manufacturers of washing machines, are nicely settled in the first unit of the number two factory which occupies a space of 90x600 feet in Peoria, Illinois. They are building the second unit to occupy the same space of 90x600 feet, as they need more room for their rapidly expanding trade.

HARDWARE CLUB OF CHICAGO BEGINS BIG DRIVE FOR MEMBERSHIP.

Starting Monday morning, December 15, 1919, and ending Tuesday noon, December 23, 1919, the Hardware Club of Chicago will make a concentrated drive for membership under the leadership of H. A. Squibbs of the American Steel and Wire Company, general chairman of the Membership Campaign Committee. John S. Kandy is vice-chairman, and William D. Lewis secretary of the committee. There is a sub-committee on publicity consisting of:

L. P. SOULE, Hardware Age;

RICHARD MORENO, AMERICAN ARTISAN AND HARDWARE RECORD;

WARREN EDWARDS, Housefurnishing Review.

A comprehensive plan for carrying on the work has been devised. The field has been mapped out into trade divisions with the following captains in charge:

Non-Resident:

BARNEY MOORE, 190 North State Street;

IRVING KEMP, of Vaughan and Bushnell Manufacturing Company, 2114 Carroll Avenue.

Auto Accessory:

A. H. VAYO, 190 North State Street.

Steel:

H. A. SQUIBBS, American Steel and Wire Company, 208 South LaSalle Street.

A. A. OLSON, Interstate Iron and Steel Company, Chicago.

Wringers and Washers:

H. G. GROSSE, American Ironing Machine Company, 168 North Michigan Avenue.

C. S. MEACHAM, Lovell Manufacturing Company, 62 East Lake Street.

Hardware:

W. S. KENNEDY, Hibbard, Spencer, Bartlett and Company.

A. HOFFMAN, 5036 South State Street.

J. V. PATTEN, 180 North Dearborn Street.

Specialty Manufacturers:

E. J. MERCIL, B. Mercil, 1911 Fulton Street.

Electrical:

JOHN S. KANDY, 24 West Washington Street.

Paper and Roofing:

H. H. HOPKINS, 111 West Lake Street.

General Membership and Advisors:

ALLAN J. COLEMAN, 208 North Wabash Avenue.

WM. D. LEWIS, 77 East Lake Street.

A. VERE MARTIN, 202 North Wabash Avenue.

HENRY STUCKART, 2517 Archer Avenue.

Special tables will be reserved at noonday luncheon for each trade division. Reports from all trade divisions will be rendered. Important announcements will be made daily by the General Chairman bearing upon the campaign. Captains will have an opportunity to determine who is inactive, discuss the general condition in his particular division, put new life and pep into his organization and send them away with a determination to get applications.

It is proposed that a Wild West Stag be put on evening December 23rd, at the close of the campaign as a reception to the new members for the purpose of extending the right hand of good fellowship and get them started as every day active club members.

MAKES FURTHER ENLARGEMENT OF ITS BUSINESS AND FACTORY SPACE.

In order to take care of the requirements for increased production of "Red Devil" tools, the Smith and Hemenway Company, Incorporated, Irvington, New Jersey, has erected a building 75 x 200 feet on part of the ten additional lots purchased for the growing needs of its plant.

A further addition to its factory space will be made in the near future. This is rendered necessary by the purchase of the business of the Corrugated Lock Washer Company. It is the purpose of Smith and Hemenway Company, Incorporated, to move the plant of the newly acquired Corrugated Lock Washer Company into part of the ten additional lots already mentioned.

ASSUMES A NEW SALES CONNECTION.

The many friends and acquaintances of James G. Geagan throughout the hardware trade will be interested in the information that he has associated himself with the Bonney Vise and Tool Company, Allentown, Pennsylvania, in the capacity of traveling sales representative with his headquarters at 1168 Peoples' Gas Building, Chicago, Illinois. Because of his unvarying patience and geniality, he has earned a reputation of which any man may well be proud.

ENUMERATES REASONS FOR THE NEED OF TRADE ASSOCIATIONS.

Although written primarily for the National Retail Coal Merchants' Association, the following article by John Walsh, former chief counsel for the Federal Trade Commission, is of interest to retailers in every line of business. For that reason it is herewith reproduced:

Trade associations are aggregations of individuals, firms or corporations engaged in a particular line of industry, acting, as a rule, under some kind of formal organization, and are not of themselves obnoxious to the law.

The general purposes for which trade associations are organized are, as a rule, laudable. They are not only beneficial to the members of the association, but also, in most instances, are in the interest of the public. The activities of trade associations in standardizing materials and production, devising more reliable and uniform cost accounting methods, communicating technical industrial information, maintaining traffic bureaus, organizing mutual insurance for members, advocating legislative policies, and promoting free social intercourse, are, to say the least, not only beneficial to members of trade associations, but make for the public good if practiced in a bona fide manner.

One of the Prime Purposes

The object of trade associations is to increase the profits of its members; in fact, they are usually formed for many worthy and legitimate purposes, as for example, increase of efficiency, protection against insolvent debtors through interchange of credit information, prevention of dishonest and unfair practices, publishing of statistical data of interest to its members, social intercourse, etc.

Trade associations organized for the purpose of supplying honest information are legal. For instance, trade associations may publish statistics giving actual bona fide sales of products, and the prices thereof, but such statistics should represent current prices based on actual sales or offers to sell or to buy, and should not, in any event, be a misrepresentation of such prices with a view of boosting prices of any item. What is in fact being done, each and all have a right to know. This is true with respect to market reports in our daily newspapers. They show the daily receipt of grain and livestock, prices received, information as to visible supply, etc. There is no reason why retail merchants of coal should not get like information as to their business, and determine their conduct by it. However, any action based upon such information must be individual and independent.

Price Agreement Illegal.

If members of trade associations enter into agreements to maintain prices, either for the purpose of increasing profits, or agree to decrease prices for the purpose of hampering competitors or compelling them to join the association, such agreements are not only in violation of State and Federal statutes, but were also condemned at common law. The policy of the law is free competition, and it plainly requires that each wholesaler or retailer shall conduct his business

independently of any compact with his competitor or competitors.

This, of course, does not prohibit any retailer from taking into account all the conditions of business in determining his own conduct, and it does not forbid cooperation for the purpose of obtaining information that is useful to each and to all.

Evasion or subterfuge will prove of little value if the true facts are made plain that the members of associations are acting in concert to restrain trade or suppress competition. The Supreme Court, speaking of the Sherman Anti-Trust Act, said that it embraced "every conceivable act which could possibly come within the spirit or purpose of the prohibition of the law, without regard to the garb in which such acts were clothed"; and declared further that "there was no possibility of frustrating that policy by resorting to any disguise of subterfuge of form, since resort to reason rendered it impossible to escape by indirection the prohibition of the statute."

Useful and Legitimate Activities.

In making a study of the operations of American trade associations, I find that those have been most successful which have been foremost in eliminating from their midst unfair competitive practices, commercial bribery, and numerous unhealthy conditions which produce jealousies, suspicions and bitter feeling among the manufacturers and traders in any given line of trade or commerce. I know from actual experience with a large number of live and constructive trade associations that the success achieved through joint and concerted action on their part in suppressing secret commissions, in eliminating wasteful and inefficient methods, in introducing uniform cost accounting methods, in promoting economic research of domestic and foreign trade developments, in studying and spreading useful information concerning Federal and State legislation and rulings by official government agencies or commissions—I repeat that the success achieved along these lines has surpassed the fondest expectations of those who advocated this kind of trade association activity.

Unfair Practices.

The term "Unfair Competition" is difficult to define or explain. Some lawyers, representing respondents before the Federal Trade Commission, contend that unfair competition is based upon the statutes and decisions of the courts, and some have taken the position that the Federal Trade Commission can only find such practices to be unfair as were condemned at common law or in decisions for violations of the Sherman Anti-Trust Act. With these definitions, however, the Federal Trade Commission does not agree, and takes the view that the law creating the Commission gave it broad power to say what are or what are not unfair methods of competition, irrespective of whether or not such practices were unlawful at common law or were specifically made unlawful by statute. In my briefs in two cases before the United States Circuit Court of Appeals, where the application, interpretation and construction of Section 5 of the Federal Trade Commission Act, preventing unfair methods of competition, is involved, I have urged as a fundamental proposition

as to what constitutes unfair methods of competition the following:

"The competitive process in trade and industry consists primarily in the economic struggle of manufacturers and distributors to secure the patronage of customers for their products. The public has adopted this theory for the reason that under this system customers obtain lower prices and better goods and service than could possibly be obtained under any other system of business and industrial organization.

"This does not mean, however, that these results will flow from the operation of the competitive process regardless of how or in what manner competition is conducted. On the contrary, competition, if entirely unregulated, may and frequently does fail to secure the results enumerated.

"The best quality of goods, the best service, and the lowest prices can only be secured to the consuming public when competition is conducted solely upon the basis of their relative production and selling costs and efficiency and when each concern obtains that portion of the total business which its costs and efficiency would enable it to obtain in competition with the production and selling costs and efficiency of other competing concerns.

"It is clear, therefore, that any method employed in competition which interferes with or obstructs the freedom of this competition of production and selling costs and efficiency necessarily restrains the various competitive units from competing as severely as their relative costs and efficiency warrant, and, in consequence, limits and restricts the development and expansion of the relatively lower cost and more efficient units to the advantage of other and presumably higher cost and less efficient establishments."

It follows, therefore, that methods which destroy the efficient along with the inefficient are economically unjustifiable and must be regarded as unfair.

Congress in creating the Federal Trade Commission, and giving it power under Section 5 of the Federal Trade Commission Act, to say what acts are prohibited by this law, did not attempt to define or state what practices constitute unfair methods of competition, for the reason that it was impossible to enumerate all the practices that may be unfair. Congress realized that if it attempted to enumerate what practices were unfair, it would not be long before new practices, theretofore unknown, would be devised, with the result that Congress would be called upon from time to time to amend the law to meet this developing situation.

Certain practices have long been regarded as unfair competition at common law, and certain other practices have been condemned as unfair methods of competition in decrees for violations of the Sherman Anti-Trust Act, but new schemes to injure, defraud and deceive competitors and the public are constantly being developed, so that it is impossible to frame a definition comprehensive enough to include all practices that constitute unfair methods of competition.

Since I have been counsel for the Federal Trade Commission it has instituted approximately 280 proceedings charging unfair methods of competition by various practices, including, among others, the use of

bogus independents, espionage of competitors, conspiracy to injure competitors, the use of blacklists, disparagement of goods and business of competitors, commercial bribery of customers and customers' employes, malicious enticement of competitors' employes, selling below cost to injure competitors, "passing-off" of goods and name, spurious inquiries for estimates, giving premiums or prizes of unequal value, attempting to close the avenues of distribution of competitors' goods and sources of their supplies, as well as false and misleading advertisements and misbranding of goods.

The Circuit Court of Appeals for the Seventh Circuit recently handed down the first decision of an appellate court as to the application, interpretation and construction of Section 5 of the Federal Trade Commission Act, preventing unfair methods of competition. The court, in sustaining an order of the Federal Trade Commission ordering the respondent to cease and desist certain practices, held that the Commission had the right to say that certain practices were prohibited by Section 5 of the Federal Trade Commission Act as being unfair methods of competition, even though such practices had not been condemned by the common law. The order of the Commission commanded the respondent to cease and desist false advertising and selling below cost. As the latter practice seems to be quite prevalent in many industries, and as it is one which is destructive of efficient business methods, and, therefore, of great interest to you, I quote what the Circuit Court of Appeals had to say with respect thereto:

"In the second paragraph of the order petitioner is commanded to cease selling sugar below cost. We find in the statute no intent on the part of Congress, even if it has the power, to restrain an owner of property from selling it at any price that is acceptable to him or from giving it away. But manifestly in making such a sale or gift the owner may put forward representations and commit acts which have a capacity or a tendency to injure or to discredit competitors and to deceive purchasers as to the real character of the transaction."

Frank and sympathetic cooperation is necessary between our business men and the Federal Trade Commission, the agency of our Federal Government to which the administration of the Federal Trade Commission Act has been given by Congress. I know, from my personal association in the Commission, that it has at all times shown a sincere and patriotic desire to be helpful to the business interests of our country. I cannot begin to tell you of the great work the Commission has done in the past and the great work it is doing now, but I know it has already rendered distinctive service, and I feel sure that on account of the interest it has in the upbuilding of business by means of fair competition, it will administer the powers and authority given it by the law with honesty, sincerity and broadness, having in mind always the constant aim to fully protect competitive conditions, not only in small industries, but in big ones.

I am familiar with some of the unfair practices members of your Association have been subjected to, and I want to say that it is up to the individual mem-

bers to see that the methods and practices indulged in by competitors in the retail coal business, as well as the practices used by the mine operators, are fair and honorable. If unfair practices exist in the coal industry, and I know they do, the members and the Association should zealously work for the elimination of such practices. Matters properly presented to the Federal Trade Commission receive very careful consideration, and if it appears from the facts presented to the Commission that unfair methods of competition are being used, it at once makes an investigation thereof and takes proper steps to prevent the recurrence of such practices.

The Commission has broad power of investigation of corporations engaged in interstate commerce, including the authority to examine books, papers and records, and take copies thereof, and to require annual or special reports of such corporations. It can thereby obtain facts in reference to the production, costs, sales, prices, practices, and other data, both of the party complained of and its competitors, thus enabling it to get full knowledge of the exact facts. Many of the proceedings before the Commission are disposed of without contest. The facts are generally very well established before a complaint is issued by the Commission and the practices involve the element of moral turpitude to such an extent that few respondents have the temerity to submit to a public inquiry.

Direct Shipments to the Consumer. I am informed that one of the thorns in the side of the retail coal dealer is the practice on the part of mine owners shipping direct to the consumer.

I realize that this is a very serious matter with you retailers, and it presents a situation which requires a great deal of thought and attention. If, after an earnest and thorough investigation, the members of this Association are convinced that direct shipments from the producer to the consumer are unprofitable, not only to the consumer, but to you retailers, then steps should be taken to educate, not only the consumer, but also the producer as to the true situation, to the end that the whole industry will be economically and efficiently improved.

As was said by the court in the United States vs. Southern Wholesale Grocers' Association, the presenting of legitimate argument to manufacturers to procure the abandonment by them of a certain policy and the continuance of another did not violate the Sherman Anti-Trust Act. However, the court in this instance did not define what was "legitimate argument," but it is a term which is not difficult of definition as pertaining to the relations between retailers and wholesalers.

Further, I am informed that in some instances mine owners shipping direct endeavor to convince the consumer that he saves money on his purchases, and that the quantity and quality of coal is better than that received from retailers. If the coal miner shipping direct is making false statements as to the saving in the price to the consumer, or as to the quantity and quality of the coal sold, such practices are unfair to other producers of coal and are clearly unfair to the public, and as such I am sure the Federal Trade Com-

mission, under Section 5 of the Federal Trade Commission Act, could afford genuine relief.

Play Fair with Your Competitor.

Many business men feel that their competitors at home, as well as abroad, are not treating them fairly. This feeling is very often based on pure imagination. You often find when you meet your competitor face to face that he is human and quite likeable. Much of the suspicion and ill feeling between competitors could be eliminated if your salesmen were instructed not to discuss a competitor's business with prospective customers, nor to comment unfairly on the other fellow's goods, but to devote their time to boosting their own products. If this policy were closely followed, the need for further legal restrictions on business would be obviated. Your salesmen should lay particular stress upon the merits of their own goods. When they promise to make prompt deliveries and render efficient service, see that those promises are fulfilled. Your business thereby will be helped and greater progress made toward fairer competitive methods.

Much time is wasted in disparaging the products of the other fellow's business which could be used to advantage in promoting your own business, and disparagement of the other fellow's goods often hurts business generally, reduces confidence, and increases discontent. The best way to get new business is not to undermine a competitor, but to create new markets and encourage increased demand.

Fair play is absolutely essential if there is to be continued freedom for American business initiative.

As has been said before, efficiency of production, efficiency of manufacture, low cost of production, and efficiency of service should be your guide for the development of your industry.

In conclusion I would say that meetings of trade associations are very, very valuable to the members, particularly for the reason that you are able to give voice to your grievances and, in a measure, seek advice from those who have had similar experiences. Loyal cooperation with your president and your secretary cannot but make for the good of the members of the Association. These meetings and your secretary's office should be the clearing house for your troubles, but you must give earnest cooperation if you would see the ideals for which you stand attain the success and the enviable reputation which the business men of America have established the world over.

ISSUES INSTRUCTIVE CATALOGUE.

A neat and instructive catalogue describing the 1920 line of bicycles and bicycle equipment is being issued by the Iver Johnson's Arms and Cycle Works, 354 River Street, Fitchburg, Massachusetts. The opening paragraph of this booklet, "The Quick Way to Anywhere," is good material for sales talks and advertising copy that may be used to advantage by retailers. The complete construction of the Iver Johnson make of bicycles is then described. Many of this company's bicycles are illustrated in this catalogue. Dimensions, weight, etc., are also given. An extensive list of bicycle equipment—a profitable line to handle—is set forth by the Iver Johnson's Arms and Cycle Works.

Some are illustrated. An interesting page is devoted to depicting various types and styles of bicycle seats. This catalogue will be sent anyone upon inquiry to the Iver Johnson's Arms and Cycle Works, 354 River Street, Fitchburg, Massachusetts.

WINDOW DISPLAY COMPETITION IS OPPORTUNITY TO EXHIBIT CREATIVE ABILITY.

You have seen pictures that actually talked. What was it in them that did it? Pigments are inanimate things. A varied arrangement of colors does not necessarily give a picture its life-like appearance. One color reproductions are known to have exceeded works of many colors. The answer is one word—arrangement. The artist knows how to arrange the color. He makes it take definite forms. Some are more successful in their work than others. A pile of wares in a window may be likened to a mass of paint. It is unattractive. Indeed, it is almost worthless. By placing the goods in definite order you give it character. Your window can be made actually to breathe. You need not be an artist to do it. Put your personality into your window displays. Make the articles express themselves. Bring form out of the mass. Create an arrangement that will challenge ever passer-by to stop. As in a picture, if your wares are formed in the most advantageous exhibits, they will be more life-like. They will compel attention. And last but not least, it will increase your profits. The cardinal principles underlying all successful window displays are simple. In arranging a window exhibit the faculties of observation should be taken into consideration. What will attract the prospective purchaser? That is the main point in window arrangements. Then, what will hold his attention and gain his interest? Perhaps you have a way of your own to accomplish this. Just how good is it? Match it with that of your fellow dealer. The Window Display Competition conducted by AMERICAN ARTISAN AND HARDWARE RECORD offers you the opportunity to compare your work of window displaying. Enter a picture and description of one of your best displays. The rules are simple, read them as follows:

Award of Prizes.

The prizes will be awarded as follows:

First prize, \$50.00 in cash, for the best photograph and description received of window display of hardware or kindred lines;

Second prize, \$25.00 in cash, for the photograph and description second in merit;

Third prize, \$15.00 in cash, for the photograph and description third in order of excellence;

Fourth prize, \$10.00 in cash, for the photograph and description fourth in degree of worthiness.

Conditions of Competition.

The conditions of the competition are as follows:

The photograph must be accompanied by descriptions of how the window displays were arranged and the materials used. The description is important and hence should be adequate. These photographs and descriptions may be sent by mail or express, charges prepaid, and must reach this office not later than Feb-

ruary 2, 1920. Address all photographs and descriptions to AMERICAN ARTISAN AND HARDWARE RECORD Window Display Competition, 620 South Michigan Avenue, Chicago, Illinois.

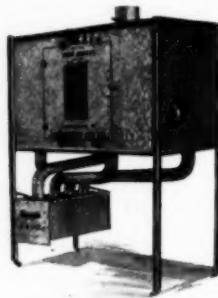
Each photograph and description must be signed by a fictitious name or device and the same name or device must be put in a sealed envelope containing the real name and address of the contestant. This sealed envelope is to be enclosed with the photograph. Contestants are permitted to enter as many photographs of displays as they please.

A Competition Committee of three will be appointed. One of them will be an expert window dresser and one an experienced hardware man. This Committee will pass upon the merits of all photographs and descriptions received, without knowing the names or addresses of the senders, and will decide the winners of the Competition.

AMERICAN ARTISAN AND HARDWARE RECORD reserves the right to publish all photographs and descriptions submitted.

GOODS FILL LONG-FELT NEED.

To fill a long felt need for a substantially built Smoke House, the Chatsworth Manufacturing Company, Chatsworth, Illinois, has produced the Number 3 Meat Smoker, shown in the accompanying illustration. This device is also made in 3, 5 and 10 Hog sizes. The manufacturers of the Meat Smoker, illustrated herewith, declare that the need for their product has been accentuated by the fact that hitherto the only similar device on the market was sold through mail order houses. In most instances, it is claimed, the devices thus sold are delivered in parts and it required a mechanic to put them together. The Meat Smoker built by the Chatsworth Manufacturing Company is said to be a substantial sheet steel drum mounted on 1 1/4 inches by 3/16 inch angle iron, put together and tested at the factory by skilled mechanics. The necessity of the customer's taking a chance on putting the proper part in the proper place is eliminated. This smoke house will hold hams, shoulders, bacons, sausages, etc. As can be noticed in the illustration, there are four pipes running from the fire-box to different parts of the drum. Equal distribution of smoke is thereby insured. In the fire-box there is a separate fire-pit that is set so as to receive a perfect circulation of cold air which is inducted through the draft door. This tempers the heat before it leaves the fire box. It then passes up the pipes, thus getting the benefit of the radiation and circulation around the meat at a medium temperature. The Chatsworth Manufacturing Company, Chatsworth, Illinois, declares that this is one of the many high grade sheet metal products it manufactures, and that it will be pleased to furnish catalogue of its goods to dealers who write to them.

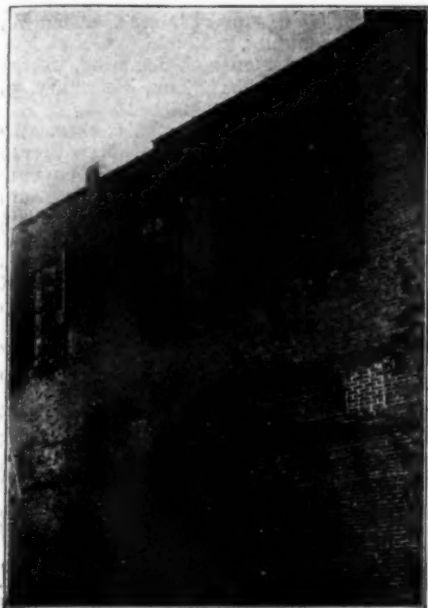


Number 3 Meat Smoker, Made by the Chatsworth Manufacturing Company, Chatsworth, Illinois.

A customer's confidence is better than his order.

PREVENTS EXORBITANT LOSSES.

A disastrous fire destroyed a large part of the business district at Milford, Illinois. After the fire, a two-story brick building was standing intact in the center of the burned area. The explanation for this phenomenon is given in a booklet, "Doo rways," published by the Richards-Wilcox Manufacturing Company, Aurora, Illinois. The story goes, four years ago



Side of Fire-Threatened Building Protected by Three R-W Fire Shutters on Lodge Hall Windows; R-W Fire Shutters Are Made by Richards-Wilcox Manufacturing Company, Aurora, Illinois.

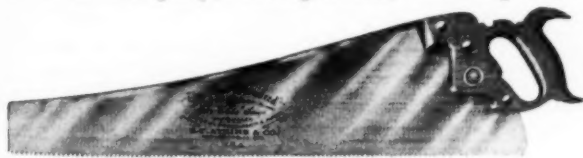
the owners of the building, evidently foresighted men, equipped it with Richards-Wilcox Automatic Fire Door Hardware and Window Shutters. They believed in being prepared for fire—and they acted on their belief. When the fire came, the building resisted the flames because of the preventive measures taken. Richards-Wilcox Automatic Fire Door Equipment and Window Shutters are an investment, declare the manufacturers. They pay dividends in the preventing of fires. Complete details concerning the exhaustive line of these goods manufactured by the Richards-Wilcox Manufacturing Company, Aurora, Illinois, will be sent upon inquiry to the company.

MUST CONSIDER HUMAN ELEMENT.

Practice efficiency. Cut down on lost motion in the retail hardware business. Make every effort count. Think efficiently. Act efficiently. Efficiency is not necessarily a cut and dried method of doing things. That is not an efficient way of doing anything. In efficiency must be taken into consideration every element entering into business. Nor can the human element be slighted. Therein lies the failure of efficiency.

IS RECOGNIZED AS STANDARD TOOL.

Today Atkins Saws, manufactured by the E. C. Atkins and Company, Incorporated, Indianapolis, Indiana, are recognized the world over as a standard tool, declare the makers. The conscientious application of E. C. Atkins, founder of the E. C. Atkins and



Atkins Saw, Made by the E. C. Atkins and Company, Incorporated, Indianapolis, Indiana.

Company, to the work of producing a perfect saw resulted in the universal acceptance of the Atkins make of tools as a standard product which could at all times be relied upon for serviceability. Because of his expert metallurgical knowledge, Mr. Atkins was able to select and produce a grade of steel best adaptable to the manufacture of saws. The wide variety of saws manufactured by this company, including the well-known "Silver-Steel" Saws—one of which is illustrated herewith—is worthy of the investigation of all dealers. Complete details will be furnished upon inquiry to E. C. Atkins and Company, Indianapolis, Indiana.

OPPORTUNITIES FOR FOREIGN TRADE PRESENTED BY BUREAU OF FOREIGN AND DOMESTIC COMMERCE.

The Bureau of Foreign and Domestic Commerce through its Special Agents, Consular Officers and Commercial Attachés is receiving information of opportunities to sell hardware and kindred lines in several foreign countries. Names and locations will be supplied on request to the Bureau in Washington or its District Offices. Such requests should be made on separate sheets for each opportunity, stating the number as given herewith:

31332.—Samples, catalogues, and price lists are desired by man in Spain with a view to representing firms for the sale of carpenters and cabinet-makers' tools and accessories. Correspondence should be in Spanish.

31333.—An agency is desired by a man from Caucasia who is in the United States for a short time for the sale in his country of tools and agricultural implements. References.

31340.—An agency is desired by a firm in Wales for the sale of general merchandise. Quotations should be given c. i. f. ports of Wales. Payment, cash against documents through bank in Wales.

31372.—A firm in Argentina desires to secure an agency for the sale of hardware and woven wire, and accessories for low-priced automobiles. Quotations should be given f. o. b. American port. Correspondence may be in English. References. Samples and advertising literature should be sent either by mail or express, but not by parcel post.

31374.—An American firm with offices in Greece wishes to represent American manufacturers in the Near East. It is in a position to handle all lines of goods. References.

31375.—A French commercial agent with six months' selling experience in the United States desires to get in touch with American manufacturers with a view to representing them in France. He is willing to spend six months in a factory to become familiar with the business. References.

31376.—A member of an American firm is about to embark upon an extended tour to Europe and desires to communicate with manufacturers and exporters with a view to representing them in performing errands of trust and assignments, and selecting and recommending foreign agents. References.

31384.—An agency is desired for the near East by a man from that region who will be in the United States for a short time, for the sale of locks and padlocks. References.

31390.—Agencies are desired by a firm in Spain for the sale of hardware. Quotations should be given c. i. f. Spanish port. Payment on delivery of merchandise. Correspondence should be in Spanish or French. References.

31394.—A firm in England having a branch office in the United States, desires to be placed in touch with manufacturers of electrical labor-saving appliances, with a view to their sale in England. It is particularly interested in washing machines, vacuum cleaners and electrical water heating apparatus. Articles of the highest class, and in large quantities are wanted.

31395.—An importer in France desires to secure an agency for the sale of hardware, enamel ware, household appliances, etc. Reference.

31398.—An agency is desired by a man in Scotland for the sale of hardware, etc. References.

31401.—The purchase is desired by a firm in China of tinplate suitable for making cans for canned goods, wire nails, iron wood screws, steel butts, padlocks, bench shears, and rotary shears. Quotations should be given c. i. f. Chefoo. Payment against letter of credit in United States currency. Reference.

31413.—A representative of a firm in Sweden has recently

visited the United States and desires to secure an agency for the sale of general merchandise which will find a ready sale in that country.

31414.—An American company which is about to send representatives to Japan and the Orient for the purpose of developing trade in American-made goods, desires to be placed in touch with manufacturers who are interested in the export of their products.

31415.—The representatives in the United States of a purchasing association in the Netherlands desires to receive quotations on building material and hardware to be used in the building of employees' and laborers' houses, which are to be erected by manufacturing concerns in the Netherlands. Reference.

31416.—A commercial agent in Panama desires to secure an agency for the sale of hardware. Correspondence may be in English. Reference.

31421.—An agency is desired by a man in Brazil for the sale of American goods of any kind. Correspondence may be in English. References.

COMING CONVENTIONS.

Automobile Accessories Branch of the National Hardware Association. Hotel Sherman, Chicago, Illinois. December 8 and 9, 1919. A. H. Nichols, Chairman, Detroit, Michigan.

Oklahoma Hardware and Implement Association, Oklahoma City, Oklahoma, December 9, 10, and 11, 1919. W. B. Porch, Secretary, Oklahoma City, Oklahoma.

Pacific Northwest Hardware and Implement Association. Davenport Hotel, Spokane, Washington, January 20, 21, 22 and 23, 1920. E. E. Lucas, Secretary, Hutton Building, Spokane, Washington.

American Washing Machine Manufacturers' Association, Hotel Sherman, Chicago, Illinois, January 21 and 22, 1920. Raymond Marsh, Secretary, 10 South La Salle Street, Chicago, Illinois.

Indiana Retail Hardware Association, Athenaeum Hall, Indianapolis, Indiana, January 27, 28, 29, and 30, 1920. Exhibit in same hall. G. F. Sheely, Secretary, Argos, Indiana.

Oregon Retail Hardware and Implement Dealers' Association, Imperial Hotel, Portland, Oregon, January 27, 28, 29 and 30, 1920. E. E. Lucas, Secretary, Hutton Building, Spokane, Washington.

Kentucky Hardware and Implement Dealers' Association, the Armory, Louisville, Kentucky, January 28, 29, 30, and 31, 1920. Hardware, Implement, and Vehicle exhibit. J. M. Stone, Secretary, Sturgis, Kentucky.

Nebraska Retail Hardware Association, Lincoln, Nebraska, February 3, 4, 5, 6, 1920. Nathan Roberts, Secretary, Lincoln, Nebraska.

Wisconsin Retail Hardware Association, Milwaukee, Wisconsin, February 4, 5, and 6, 1920. P. J. Jacobs, Secretary, Stevens Point, Wisconsin.

Iowa Retail Hardware Association, Auditorium, Des Moines, Iowa, February 10, 11, 12 and 13, 1920. A. R. Sale, Secretary, Mason City, Iowa.

Michigan Retail Hardware Association, Hotel Pantlind, Grand Rapids, Michigan, February 10, 11, 12 and 13, 1920. Exhibit in Furniture Exhibition Building. Arthur J. Scott, Secretary, Marine City, Michigan.

Pennsylvania and Atlantic Seaboard Hardware Association, Bellevue Stratford Hotel, Philadelphia, Pennsylvania, February 10, 11, 12, and 13, 1920. Exhibition in Philadelphia Commercial Museum. Sharon E. Jones, Secretary, 1314 Fulton Building, Pittsburgh, Pennsylvania.

North Dakota Retail Hardware Association, Grand Forks, North Dakota, February 11, 12 and 13, 1920. Hardware exhibit in Grand Forks Municipal Auditorium. C. N. Barnes, Secretary, Grand Forks, North Dakota.

Illinois Retail Hardware Association, Hotel Sherman, Chicago, Illinois, February 17, 18, and 19, 1920. Exhibit in connection. Leon D. Nish, Secretary, Elgin, Illinois.

Minnesota Retail Hardware Association, St. Paul Auditorium, St. Paul, Minnesota, February 17, 18, 19 and 20, 1920. H. O. Roberts, Secretary, 1030 Metropolitan Life Building, Minneapolis, Minnesota.

New York State Retail Hardware Association, Onondaga Hotel, Syracuse, New York, February 17, 18, 19 and 20, 1920. Exhibition in State Armory. John B. Foley, Secretary, 607 City Bank Building, New York City.

Missouri Retail Hardware Association, St. Joseph Auditorium, St. Joseph, Missouri, February 17, 18, and 19, 1920. F. X. Becherer, Secretary, 5136 North Broadway, St. Louis, Missouri.

New England Hardware Dealers' Association, Mechanics' Building, Boston, Massachusetts, February 23, 24, and 25, 1920. George A. Fiel, Secretary, 10 High Street, Boston, Massachusetts.

South Dakota Retail Hardware Association, Sioux Falls, South Dakota, February 24, 25, 26, and 27, 1920. Exhibit in connection. H. O. Roberts, Secretary, Metropolitan Life Building, Minneapolis, Minnesota.

Ohio Hardware Association, Hotel Gibson, Cincinnati,

Ohio, February 24, 25, 26 and 27, 1920. James B. Carson, Secretary, Dayton, Ohio.

Michigan Sheet Metal Contractors' Association, Saginaw, Michigan, March 2, 3, and 4, 1920. F. E. Ederle, Secretary, Grand Rapids, Michigan.

National Warm Air Heating and Ventilating Association, Cleveland Hotel, Cleveland, Ohio, April 21, 1920. Allen Williams, secretary, Columbia Building, Columbus, Ohio.

Stove Founders' National Defense Association, Boston, Massachusetts, May 11, 1920. R. W. Sloan, Secretary, 826 Connell Building, Scranton, Pennsylvania.

Old Guard Southern Hardware Salesmen's Association, Marlborough-Blenheim Hotel, Atlantic City, New Jersey, May 12, 1920. R. P. Boyd, Secretary, Knoxville, Tennessee.

Southern Hardware Jobbers' Association, Marlborough-Blenheim Hotel, Atlantic City, New Jersey, May 11, 12, 13, and 14, 1920. John Donnan, Secretary, Richmond, Virginia.

American Hardware Manufacturers' Association, Marlborough-Blenheim Hotel, Atlantic City, New Jersey, May 11, 12, 13, and 14, 1920. F. D. Mitchell, Secretary, 4106 Woolworth Building, New York City.

National Association of Stove Manufacturers, Boston, Massachusetts, May 12 and 13, 1920. Robert S. Wood, Secretary, National State Bank Building, Troy, New York.

National Association of Sheet Metal Contractors, Peoria, Illinois, June 8, 9 and 10, 1920. Edwin L. Seabrook, Secretary, 261 South Fourth Street, Philadelphia, Pennsylvania.

RETAIL HARDWARE DOINGS.

Iowa.

W. A. Spurrier, Jr., has sold his hardware business at 417 Sixth Avenue, Des Moines, Iowa, to C. A. Lockard.

Kansas.

Roy Bates has purchased a hardware business at Bucklin. C. M. Chandler has sold his interest in his hardware business at Marysville to R. M. Robertson.

Kentucky.

The Young Hardware Company has been incorporated at Hopkinsville with a capital of \$20,000, by J. C. Stites, B. C. Schmidt, Thurston M. Layne.

Minnesota.

Henry Coulet has sold his interest in the Coulet Hamme Hardware Company at Anamia to Axel Peterson.

Missouri.

A. Nelson sold his hardware business to R. Simms and G. Noodin.

The Anderson Hardware and Lumber Company has been incorporated at Anderson with a capital of \$25,000 by L. E. Higgs, Chas. A. Allman, W. A. McDonald, W. E. Roark, C. O. Brady, and others.

Montana.

The Beaty Sporting Goods Company has been incorporated at Butte with a capital of \$100,000, by W. L. Beaty, I. O. Proctor and H. Strassburger.

The Saco Hardware, Furniture and Lumber Company at Saco has been purchased by the George A. Fischer Lumber Company.

Nebraska.

Ernest Frederick purchased the sporting goods business of Fred Sawyer of Columbus.

F. E. Anderson bought a hardware business at Paxton.

T. M. Hill has opened a hardware store at Shubert.

S. E. Lewis has sold his hardware store at Grant to McGahan and Jameson.

North Dakota.

The Drosby Hardware and Implement Company at Crosby have sold their hardware stock to J. K. Bory and Anton Dtheim.

Oregon.

Strins Cycle Company has been incorporated at Portland with a capital of \$10,000, by George S. Strine, C. E. Strine, G. E. Sanderson, Harvey Wells, and Chas. C. Hindmann.

South Dakota.

The Mitchell Hardware Company at Isabel has been sold to Fuller and Linnel.

Tennessee.

Jamestown Hardware and Grocery Company has been incorporated at Jamestown with a capital of \$10,000 by J. B. Reagan, F. H. Chism, B. R. Chism and Mary Chism.

The Everett Hardware Company at Sparta has been succeeded by the Mayberry Hardware Company.

Washington.

A. R. Remick sold his hardware business at Kilso to L. J. Short and M. Letsinger.

Wisconsin.

H. C. Duecker of Kiel has purchased the Cepeck Hardware Store at Algoma.

Miller and Bock have succeeded the June F. Price Hardware Store at Dousman.

Edward Gruber and Henry Shield of Medford have purchased the Belott and Alpine hardware business at Merrill.

A 24x60 foot addition is being erected at Prairie du Chien for the J. G. Widmann Hardware Company.

AUTOMOBILE ACCESSORIES SOLD BY HARDWARE DEALERS

INDICATES A PROFITABLE LINE FOR HARDWARE DEALERS.

According to an authority on the subject, there will be 15,000,000 automobiles in operation in the United States within the next twenty years. Even now it is said the average is one machine to every eighteen inhabitants of the country.

As a rule, shops where materials can be purchased with which to repair or replace torn or worn curtains and tops or broken window lights, or shops making a specialty of doing such repair work for car owners are found only in the larger cities and towns.

Repairs of this nature are not usually difficult. The main thing is to get the material with which to make them.

The hardware store that will carry in stock some rubber top and curtain goods and transparent sheeting will not lack for customers if the proprietor will let auto owners know he is prepared to supply their needs and will suggest to them the desirability of keeping their cars in repair and the simplicity of the work itself.

Curtain windows, particularly, can be made as staple an article of trade in the hardware store as window glass. In fact, it is probable that more auto windows are broken than residence windows. Notice the cars passing with broken lights, then note broken windows in houses; of which do we see the most?

The hardware store should be able to supply not only the individual who may be forced or may prefer to make his own repairs, but the small auto trimming and repair shop that would find it a great convenience to buy locally.

UNBRANDED TIRES AND TUBES HURT THE DEALER'S BUSINESS.

Unbranded and unknown tubes constitute a serious menace to tire life. The unbranded tube is obviously of lower quality than the standard brand, and of such low quality that the maker will not put his name on it. Consequently, they are offered at lower prices. From experience the public learns to shun such products, and the dealers selling them are looked upon with suspicion.

Even the best tube is not made purely of rubber. Other ingredients are used with the rubber, just as others materials are used in making "solid" gold. However, it is the amount and quality of the ingredients that determine the quality of the tube. All a tube has to do is to hold air and keep on holding air. The more pure rubber it contains the better it will contain air. It is obvious, considering the many grades of rubber on the market, that high grade rubber is the most necessary material in the tube. So, in a general

way, if one tube is of cheaper quality than another it is because the cheaper tube has less and an inferior grade of rubber.

Good tubes add life to tires. They are just as important as good casings. Many motorists could well afford to throw away their cheap tubes and replace them with high quality tubes. Money would be saved in the end. And dealers handling standard and reliable goods will be depended upon by their customers to furnish them value in tubes and tires.

THERE IS MONEY IN VULCANIZERS.

Every customer of the dealer in automobile accessories can find use for a vulcanizer. He is sure to need it at some time or other. Therefore, the dealer should sell him one. Tubes are easily handled by the average owner, except where large rents have been made as for example those resulting from a blow-out. A good selling argument is that the owner should be familiar with repairs so that there never will be any serious delay on the road. A tube repair may be made by means of cementless patches, cement patches or by vulcanizing. There are many forms of special patches which do not require vulcanizing. However, it is generally conceded that a gasoline vulcanizer is much more effective and requires little more time. The space around a tube puncture which is to be vulcanized should be cleaned with gasoline and then rubbed over lightly with a piece of sandpaper to roughen the surface. Cement is then applied which is allowed to dry. Three coats are given and then the patch is applied. After this, the vulcanizer is put in position. It is well, however, to spread a piece of paper over the patch before applying the vulcanizer.

Be sure that the vulcanizer face lies flat against the patch. An error often made is in using a patch that is too small and not vulcanizing properly. The patch not thoroughly vulcanized will creep away from the puncture and you have the trouble all over again.

Another error often made when patching on the road is to allow the wind to blow the flame to one side. Usually the work is done on the running board and the car can so be turned that one side is protected from the wind.

CAN USE LOT FOR PARKING SPACE.

Hardware dealers open to suggestions tending to show them how to increase accessory sales, will do well in seriously considering this one: If there is a vacant lot in your vicinity rent it. Erect a fence around it. Clean it up and use it as a parking space. While the car owners are busy elsewhere minor repairs can be made, tires can be replaced. Oil and gasoline can be sold. The charge for parking should be merely nominal.

General Outlook for Warm Air Heater Industry Is of a Highly Encouraging Nature.

America's position as a commercial factor in the world's business was revealed by the war. The development of the vast resources of this country has placed it foremost as a productive nation. Should all obstacles be removed, and production proceed at the rapid strides which the majority of manufacturers wish it to, prosperity is assured. The warm air heater industry, by its proved superiority for healthful heating products, is rapidly gaining the favor it deserves in the public mind. The growth of the nation's industries saw an increase in the adoption and manufacture of warm air heaters. The war, for a time, delayed the forward movement in this field. Now the war is over. The warm air heater business, along with the rest of the country's commercial enterprises, seeks to continue its work with full force and to extend its prestige in the American household. That this business is destined, because of its basic principles, materially to increase, is the unanimous opinion of all warm air heater manufacturers. Nor is it merely to increase. Judging from the large number of letters received in reply to questionnaires sent out by AMERICAN ARTISAN AND HARDWARE RECORD, to manufacturers throughout the country, the coming year is to be one of the best—some claim the best—in the history of the business. Manufacturers in all parts of the United States, declare that the year 1920 will be a banner year. The only conceivable hindrance to voluminous sales of warm air heaters for the ensuing year, is the unsettled labor market. However, most producers foresee an adequate settlement of this phase of industry. American labor realizes that its prosperity depends upon the enhancing of business and production in general. The agitators, made bold by the tolerance of the laboring man, will sooner or later meet their due. In fact, their complete routing is imminent.

Building, according to reliable observers, is already normal, and is gaining in momentum. In the words of ninety-nine out of every hundred manufacturers questioned, the general business outlook for the coming year is good.

There is one requisite to the life of all industries that can not be abandoned—constant improvement. The average warm air heater, commendable as are the results obtained, is subject to improvement. One particular branch of the warm air heater industry has been subject to varied opinions. That is the pipeless warm air heater. In reply to questions as to whether or not the pipeless warm air heater is injuring the trade as a whole, conflicting replies were received. Manufacturers are equally divided as to the effect of the pipeless on the business in general. A manufacturer of repute declares that the pipeless is a decided improvement over the stove and is a means of educating those who will not venture to install a multiple

register warm air heater in their homes. As a result of adapting the pipeless, avers this producer, should it not prove sufficient to supply adequate warmth, the consumer will eventually purchase a regular warm air heater. This is logical. Also, others say that the pipeless is more and more becoming known. Its true possibilities are being realized by the public. Still, there are prominent manufacturers who claim that the pipeless is, to some extent, injuring the warm air heater industry. This is due, they say, to the exaggerated claims made for them by their producers or promoters. But, in the words of one of the respondents, "As is the case with all business, should pipeless dealers continue to claim more for their product than can be actually obtained, it will eventually mean their own ruin." Greater accuracy of statement is, therefore, desirable in this branch of the industry.

Interest was evoked by the questions of whether installers should be licensed by the State, and whether the State should enact laws governing installation. The majority of answers to these questions emphatically are against State licensing of installers. A few believe that it would raise the standard of the individual installer. As to State laws governing installation, the main objection is because of the political intricacies of similar laws already existing in other branches of the industry. Some manufacturers believe that a long, involved State law governing installation of warm air heaters would tend only to confuse, yet they favor such a law if it is compiled by practical and experienced heating men.

In the interest of the trade as a whole, it is the general opinion among manufacturers that collective publicity for the purpose of educating the public in the superiority of warm air heating as compared with other systems, would be beneficial to all concerned. It was stated that this need not interfere with the ambition of individual manufacturers to portray the alleged advantages of their product over others. They could do that in their own advertising.

Referring to methods of aiding retailers to increase their sales—which means a consequent increase in production—many experienced manufacturers declare that the best means would be to employ practical salesmen—men who have a technical knowledge of the business. Also, that only reliable products should be manufactured.

Only a few manufacturers object to the government experts' recommendation of taking cold air entirely from the floor inside the house. They believe that the air, in time, would become stagnant. However, it is the predominating belief and experience that this method is correct. One manufacturer says that he has used this method for over twenty years with success. Several stated that provisions should be made

to take in about 25 per cent of outside air in connection with inside intake.

The subject of a special humidifying device is dealt with from the negative as well as the affirmative side by manufacturers. Some contend that the entire question of humidity is over-rated; others declare it is under-rated. Many of long and varied experience believe that a special humidifying device would be an advantage. They state that the average water pan is neglected and that an automatic humidifier would better the healthfulness of the warm air heater.

The conclusion to be drawn after a careful reading of all the letters is, that the possibilities for the warm air heating trade for the coming year are good; that sales were, on the average, 100 per cent greater for 1919 than the previous year, and that the business outlook in general is very optimistic. No radical improvements were made in warm air heaters during the past year. Many small betterments are recorded on almost all makes of heaters. Considering the decrease of faulty installation, which sometimes was the cause of detracting from the highest utility of the warm air heater, and noting the closer cooperation between retailers and manufacturers, the progress of this industry is remarkable.

COOPERATIVE RESEARCH IN WARM AIR FURNACES AND FURNACE HEATING SYSTEMS AT THE UNIVERSITY OF ILLINOIS.

By A. C. WILLARD,

Professor of Heating and Ventilation, University of Illinois.

This undertaking is being conducted under a cooperative agreement between the National Warm Air Heating and Ventilating Association and the University of Illinois for an investigation of warm air furnaces and furnace heating systems. The agreement was formally approved in August and became operative on October 1, 1918. Such work as has been done between October, 1918, and May, 1919, and the results are set forth in a more or less summarized form in Bulletin No. 112 of the Engineering Experiment Station of University.

Under the terms of this present agreement, the Association is to provide funds in an amount not to exceed \$8,000 for a period of one year to defray part of the expense of this research work. The University through its Engineering Experiment Station is to assume the responsibility of maintaining the necessary staff and conducting the investigation and, of course, it is further responsible for the reliability and unbiased character of all results obtained. To this latter end, the Engineering Experiment Station reserves the exclusive right to publish any and all test data and results. Such publication will be made from time to time in official bulletins of the Station for the purpose of furnishing whatever scientific and technical data are developed in this work for the benefit of the engineering profession and the warm air furnace industry.

It should be noted that the fundamental ideas involved in the methods used in this investigation, as

well as the furnace plant itself and its essential features, were developed and put into operation by the Department of Mechanical Engineering of the Uni-



A. C. Willard, Professor of Heating and Ventilation, University of Illinois.

versity of Illinois in the spring of 1918. Realizing the great possibilities in extending the scope and value of the investigation by enlisting the active support and interest of the Manufacturers' Association, a formal proposal for a cooperative investigation was made to the Association in June, 1918 at its annual



Method of Making Anemometer Traverse at Register Faces on Main Plant.

meeting in Milwaukee, Wisconsin. This proposal received the unqualified approval of the Association.

Objects of the Investigation.

The principal objects of the investigation are briefly stated as follows:

(1) To determine the efficiency and capacity of commercial warm air furnaces under conditions similar to those existing in actual installations with leaders, stacks and registers to form a complete system.

(2) To determine satisfactory and simple methods for rating furnaces so that the proper size and type of furnace can be definitely selected for the service required.

(3) To determine methods of increasing the efficiency and capacity of furnace heating equipment and the advantages or desirability of certain types of design.

(4) To determine the heat losses in furnace heating systems and the value of insulating materials as affecting the economy of the furnace or the leaders and stacks, and finally of the system as a whole.

(5) To determine the proper sizes and proportions of leaders, stacks and registers supplying air to first, second and third floors.

(6) To determine the friction losses in the cold air or recirculating ducts and registers and their proper size, proportions and arrangement or location.

(7) Eventually, to make a study and comparison of outside and inside air circulation as affecting the economy and operation of furnace systems.

SPECIAL PROBLEMS INVOLVED IN THE MEASUREMENT OF TEMPERATURES AND AIR VELOCITIES.

This investigation involves two special problems the correct solution of which is absolutely vital to its success. Their existence was recognized from the outset, and the difficulties involved in their solution account for the fact that practically no testing work using a complete plant has ever been done in the field of gravity furnace heating.

Measurement of Temperatures.

The first problem involves the accurate measurement of air temperatures at a great many points ranging from the air inlet, through the furnace casing to the bonnet, and then through leaders, boots and stacks to the register outlets on the various floors. From a consideration of the fact that a ten-leader plant is in operation in these tests it will be apparent that from forty to fifty or more temperatures must be measured, checked and recorded every time a set of readings is taken during a test. As from five to six sets of readings are necessary on each test it is evident that a very elaborate and an accurate system of temperature measurement is required.

Measurement of Air Velocities.

The second problem is far more difficult of solution than the preceding one and involves the measurement of air flow at the very low velocities or heads occurring in gravity warm air furnace systems.

It will be evident that no furnace can be tested for efficiency, capacity or rating unless it is possible to determine accurately the amount of air entering the cold air or recirculating inlet and also to measure with equal accuracy the distribution of this air to each of the floors above the furnace.

In order to accomplish the latter object, it is necessary to measure the outflow of heated air at each register face while the test is in progress, and not interfere in any way with the natural operation of the



Side View of Main Plant, Showing Uehling CO₂ Apparatus at Right, With Air Inlet Connections Behind Uehling Apparatus.

system. The velocities at all these points are small, only a few feet per second at the most, and air measuring instruments which would be quite suitable at higher velocities are either useless, or else subject to serious errors when used at these low rates of flow.

After a great deal of preliminary work in the winter of 1917-18 it was finally decided to attempt what might be called a "combination scheme" of measurement. In this scheme an instrument which is quite suitable for use at high velocities is used to "check," and give the proper correction factor for the reading which is actually taken by a low velocity instrument

best adapted to the conditions to be met in the furnace testing plant.

This "checking" or calibrating work has all been done in two specially designed plants. These plants are constantly available for recalibrating the low velocity instruments at any time, *under the identical conditions as regards air temperature, rate of flow, shape of inlet or outlet, and kind and size of register that exists in the main or auxiliary testing plant.*

RESULTS OF TYPICAL TESTS, RUN ON MAIN PLANT.

The results of five complete tests, on the main plant showing variations in efficiency with register temperatures, are given herewith. A consideration of the results from the first three tests shows that the so-called radiation loss from the double casing and the bonnet of the furnace was high. If the first test No. A-1 is taken, it appears that in a 12-hour run with an average equivalent register temperature of 149.8 degrees above a 65 degrees Fahrenheit inlet temperature the heat put in the air passing through the furnace before it left the bonnet amounted to 54 per cent of the total heat in the coal burned.

In all tests, this agreement must be close or else the test must be rejected.

THE ORGANIZATION OF THE FURNACE RESEARCH STAFF AND THE ADVISORY COMMITTEE.

The terms of the agreement between the Association and the University provide for a staff composed of at least two full-time research associates and one half-time research assistant working under the supervision of the Engineering Experiment Station. In addition to these men, this work is to be carried on in consultation with an Advisory Committee on Furnace Research appointed by the President of the Warm Air Heating and Ventilating Association.

It was found impossible to assemble the complete research staff at the time the cooperative agreement became effective, and it was not until October 17, 1918, that the first man reported for duty. In the meantime a large amount of preliminary work had been done by Professors Willard and Kratz in getting the original plant equipped and in developing the calibrating plants. As soon as Professor S. L. Simmering arrived, F. G. Wahlen was detailed to assist him,

TABLE 5.
SUMMARY OF FIVE COMPLETE PLANT TESTS FOR EFFICIENCY AND CAPACITY OF FURNACE.

| ITEM | Uncovered Casing | | | Lagged all over | Lagged above Middle Ring A-5 |
|---|------------------|---------|---------|-----------------|------------------------------|
| | A-1 | A-2 | A-3 | A-4 | |
| Date of test..... | 4-23-19 | 4-30-19 | 5-1-19 | 5-3-19 | 5-9-19 |
| Duration in hours..... | 12.0 | 12.0 | 9.5 | 12.0 | 12.0 |
| Ave. Temp. at Register Faces, deg. F. (actual)..... | 169.4 | 182.5 | 197.7 | 188.3 | 175.4 |
| Ave. Temp. at Register Faces, deg. F. (above 65 deg. F.).... | 149.8 | 167.5 | 186.1 | 168.8 | 167.0 |
| Total weight of coal fired, lb..... | 256.0 | 255.0 | 255.0 | 255.0 | 255.0 |
| Total weight of refuse out, lb..... | 141.5 | 107.3 | 108.5 | 112.5 | 114.5 |
| Total equivalent coal in refuse, lb..... | 110.0 | 86.2 | 86.6 | 90.0 | 91.1 |
| Total weight of coal burned, lb..... | 146.0 | 168.8 | 168.4 | 165.0 | 163.9 |
| Rate of combustion, lbs., per sq. ft..... | 4.23 | 4.89 | 6.16 | 4.77 | 4.74 |
| Average chimney draft, inches water..... | 0.054 | 0.054 | 0.079 | 0.053 | 0.058 |
| B.t.u. per lb. coal as received..... | 12791 | 12791 | 12791 | 12791 | 12791 |
| B.t.u. per lb. refuse at end of test..... | 10023 | 10260 | 10200 | 10216 | 10180 |
| Heat developed by coal burned per hr., B.t.u..... | 155,500 | 179,800 | 226,500 | 175,900 | 174,700 |
| Ave. temp. of air at inlet, deg. F..... | 84.6 | 80.0 | 76.6 | 84.5 | 73.4 |
| Ave. bonnet temp., deg. F. (actual)..... | 181.5 | 194.8 | 210.7 | 200.2 | 188.0 |
| Ave. temp. rise, inlet to bonnet, deg. F..... | 97.0 | 114.8 | 134.1 | 115.7 | 114.6 |
| Ave. bonnet temp., deg. F. (above 65 deg. F.)..... | 172.0 | 179.8 | 199.1 | 180.7 | 179.6 |
| Cu. ft. air entering inlet per hr..... | 50.460 | 53.880 | 57.120 | 50.760 | 52.740 |
| Wt. of air entering inlet per min., lb..... | 60.15 | 65.00 | 68.30 | 60.30 | 64.20 |
| Wt. of air leaving registers per min., lb..... | 59.76 | 67.15 | 71.16 | 64.31 | 68.11 |
| Heat put into air per hr. at bonnet, B.t.u..... | 84,200 | 107,500 | 132,000 | 100,500 | 106,000 |
| Ave. temp. of flue gases, deg. F..... | 458 | 554 | 676 | 572 | 575 |
| Overall efficiency* of furnace, per cent..... | 54.20 | 59.70 | 58.20 | 57.20 | 60.66 |
| Heat loss in dry flue gas, per cent..... | 8.82 | 10.62 | 12.98 | 10.85 | 11.46 |
| Heat loss in water vapor, per cent..... | 4.30 | 3.89 | 4.16 | 4.00 | 4.06 |
| Heat loss by radiation, and unaccounted for, per cent..... | 32.68 | 25.79 | 25.66 | 27.95 | 23.82 |
| Vel. in leaders, ft. per min. 1st floor (average)..... | 131 | 148 | 167 | 145 | 144 |
| Vel. in leaders, ft. per min., 2d floor (average)..... | 226 | 252 | 271 | 257 | 261 |
| Vel. in leaders, ft. per min., 3d floor (average)..... | 274 | 307 | 332 | 275† | 310 |
| B.t.u. available per sq. in. leader, 1st floor (average)..... | 67 | 91 | 120 | 89 | 89 |
| B.t.u. available per sq. in. leader, 2d floor (average)..... | 104 | 140 | 172 | 143 | 146 |
| B.t.u. available per sq. in. leader, 3d floor (average)..... | 142 | 191 | 234 | 165† | 192 |
| Barometer, inches mercury..... | 29.28 | 29.43 | 28.98 | 29.18 | 29.37 |

*These efficiencies are based upon weight of air as measured at inlet, and bonnet temperature corrected for radiation by the method already indicated.

†3d floor leaders dampened.

The heat carried away in the dry flue gases was 8.82 per cent and that lost in water vapor in the flue gases was 4.30 per cent, so that only 67.32 per cent is accounted for. This means that over 32 per cent of the heat value of the coal burned was lost from the furnace casing and bonnet by radiation or in some unaccounted for manner.

Attention should be directed to the fact that in this test the actual weight of air entering the furnace as measured at the inlet was 60.15 pounds per minute. The sum of the weights of air leaving the 10 register faces was 59.76 pounds, or only 0.65 per cent less.

and Professor Kratz has devoted an increasing amount of his time to the work since October 1. With the addition of V. S. Day on December 18, 1918, and finally of W. E. Pratt on January 16, 1919, a very effective organization has been perfected and the work has been progressing rapidly and effectively, since January of this year. It should also be noted that at all times there have been available one or more machinists and mechanics of the Mechanical Engineering Department as well as F. W. Stearns (special mechanic) who has been of the greatest assistance in taking data on many tests. In the operation of the

main plant on a complete 10 to 12 hour test at least five men are absolutely necessary.

The personnel of the Research Staff has been made up as given below.

Furnace Research Staff.

Dean C. R. Richards, Dean College of Engineering and Director Engineering Experiment Station.

Professor A. C. Willard, Professor Heating and Ventilation.

Professor A. P. Kratz, Research Assistant Professor.

*Professor S. L. Simmering, Research Associate.

Mr. F. G. Wahlen, Research Graduate Assistant.

†Mr. V. S. Day, Research Assistant and Acting Secretary.

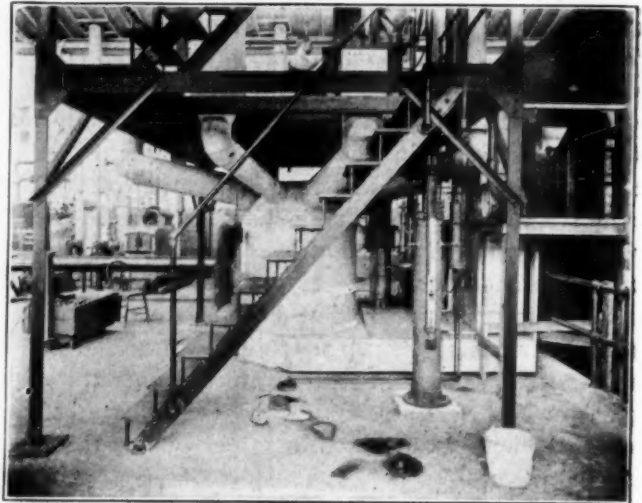
‡Mr. W. E. Pratt, Special Investigator and Research Associate.

The Advisory Committee held its first meeting at the University on December 17, 1918. R. C. Cook was unable to be present at this meeting, and W. A. Toohar represented Walter Wimmer. Since then, both J. M. McHenry and P. J. Dougherty have been

Furnace Department, Detroit Stove Works, Detroit, Michigan.

Mr. P. J. Dougherty, Heating Engineer, International Heater Company, Utica, New York.

Mr. R. C. Cook, Manager Thatcher Furnace Company, New York City.



Side View of Main Plant, Showing Uehling CO₂ Apparatus at Right, With Connections Behind Uehling Apparatus.

Mr. Walter Wimmer, Manager, Furnace Department, Wrought Iron Range Company, St. Louis, Missouri.

Mr. E. S. Moncrief, Vice-President, The Henry-Miller Foundry Company, Cleveland, Ohio.

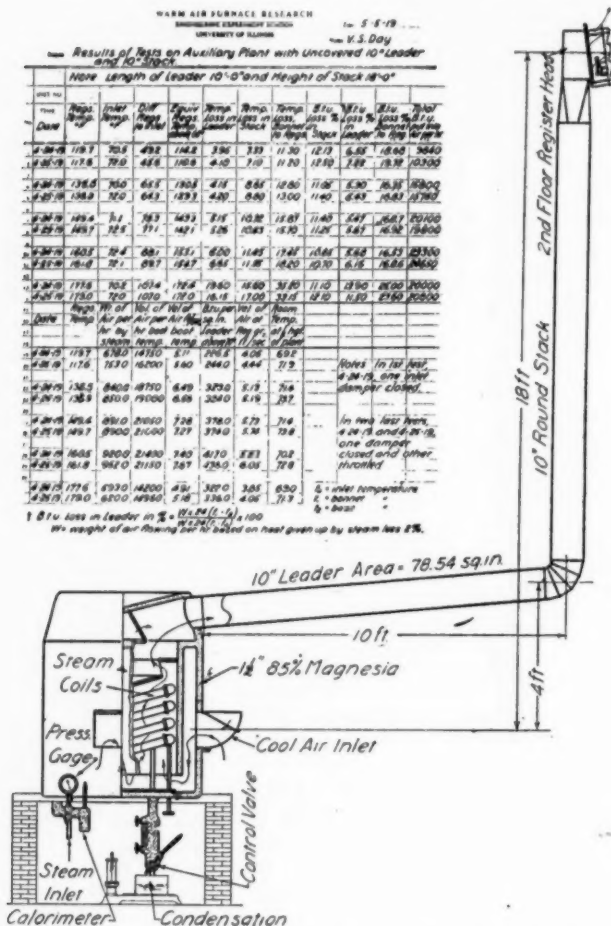
APPLICATION OF THERMOCOUPLES TO THE MEASUREMENT OF LOW TEMPERATURES.

By A. P. KRATZ,

Research Assistant, Professor Mechanical Engineering Department, University of Illinois.

Thermocouples are widely used for the measurement of high temperatures and the principles involved are well known. The application of these principles to the field of low temperature measurement, however, is not so generally understood. At the outset of the investigation of warm air furnaces, undertaken by the Engineering Experiment station at the University of Illinois, in cooperation with the National Warm Air Heating and Ventilating Association, the necessity for an accurate and at the same time a convenient method for measuring the temperatures, about forty in all, became apparent. The thermocouple method was chosen because the temperatures could all be read from a central point, by merely operating a dial switch, much more rapidly than could be accomplished by an observer moving from point to point and reading an instrument at each station.

The principle involved in the use of thermocouples is very simple. If two wires of different composition are joined together in the shape of a continuous loop, and the junction points thus formed are maintained at different temperatures, an electromotive force, or difference in potential, is induced at the junctions, which will in turn cause a current to flow around the loop. The electromotive force is a function of the the dif-



Sectional View and Chart of Furnace Testing Plant.

frequent visitors at the University and have kept in close touch with the progress of the work. The present program of investigation was outlined at the time of this meeting in joint conference with the members of the research staff. The complete organization of this committee follows:

Advisory Committee on Furnace Research.

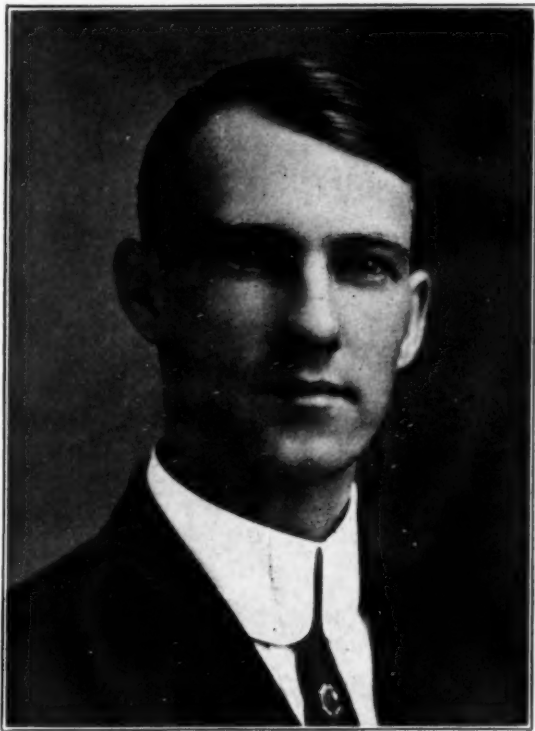
Mr. J. M. McHenry, Chairman, Manager of the

*Appointed October 18, 1918. Resigned March 31, 1919.

†Appointed December 18, 1918.

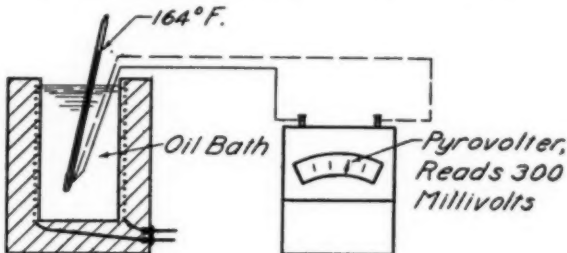
‡Appointed January 16, 1919.

ference in temperature. If, now, one of these junctions is maintained at a constant temperature, as for instance, that of melting ice, the electromotive force induced will increase or decrease as the temperature of the hot junction increases or decreases. For any

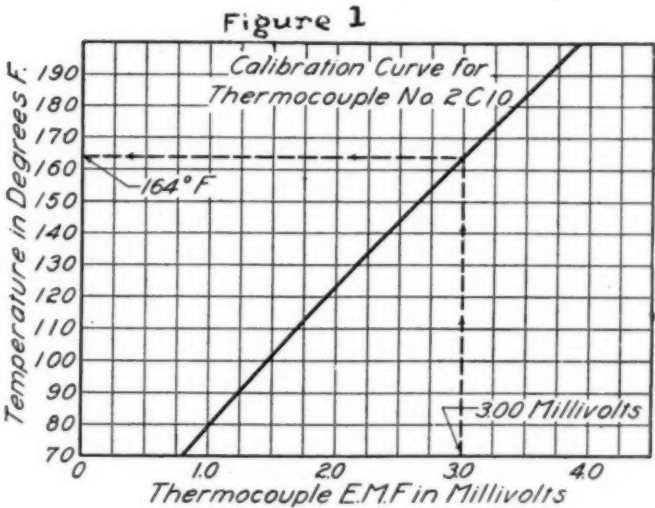


Professor A. P. Kratz, Research Assistant, University of Illinois.

given composition of metals this relation will always be the same, hence a number of readings of the electromotive force may be taken with the hot junctions at



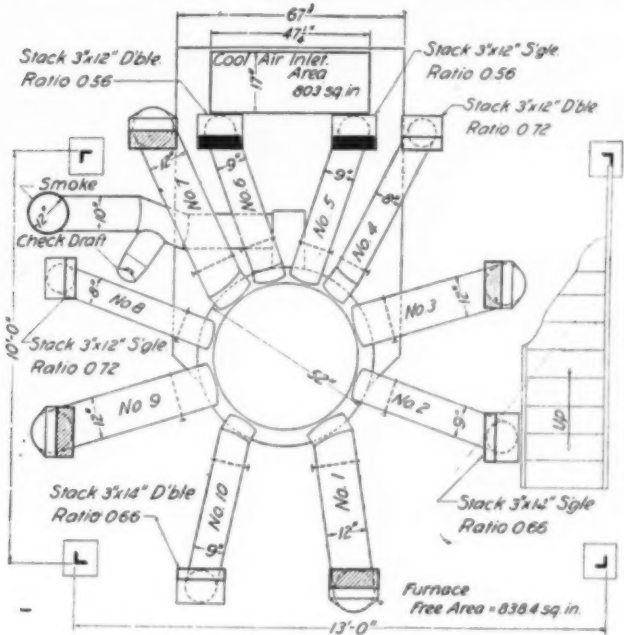
Calibration of Thermocouple



known temperatures, and a curve plotted between electromotive force and temperature. Then for any other readings of the electromotive force, obtained by using the instrument, the temperature prevailing at the hot junction which must have caused this reading, may

at once be obtained from the curve. Such a curve, taken from Engineering Experiment Station Bulletin No. 112, Report of Progress in Warm Air Furnace Research by A. C. Willard, is given in Figure 1 and also a diagram showing the method of calibrating the couple, or obtaining the curve.

The couple is placed in an electrically heated oil bath with its hot junction bound to the bulb of a standard mercury thermometer and readings of the pyrovolter, or electrical measuring device are taken, together with the temperature indicated by the ther-



| | Leaders | | | Stacks | | Registers | |
|---|---------|-------|-----------|--------------|------|-----------------------|-------------|
| | No | Size | Area | Dimensions | Type | Dimensions | Free Area |
| 1st Floor | 1 | 12 in | 113 sq in | | | 11 1/2 in x 12 1/2 in | 0.684 sq ft |
| | 3 | 12 in | 113 sq in | | | " " | " " |
| | 7 | 12 in | 113 sq in | | | " " | " " |
| | 9 | 12 in | 113 sq in | | | " " | " " |
| 2nd Floor | 2 | 9 in | 64 sq in | 3 in x 14 in | Sgle | 8 1/2 in x 11 1/2 in | 0.458 sq ft |
| | 4 | 8 in | 50 sq in | 3 in x 12 in | Dble | " " | " " |
| | 8 | 8 in | 50 sq in | 3 in x 12 in | Sgle | " " | " " |
| | 10 | 9 in | 64 sq in | 3 in x 14 in | Dble | " " | " " |
| 3rd Floor | 5 | 9 in | 64 sq in | 3 in x 12 in | Sgle | " " | " " |
| | 6 | 9 in | 64 sq in | 3 in x 12 in | Dble | " " | " " |
| Leader Area, 1st Fl 452 sq in, 2nd 228 sq in, 3rd 128 sq in. Total 808 sq in. | | | | | | | |
| Percent Leader Area 1st Fl 55.9, 2nd 28.2, 3rd 15.8 | | | | | | | |

FLOOR PLAN AND DIMENSION TABLE FOR FURNACE TESTING PLANT.

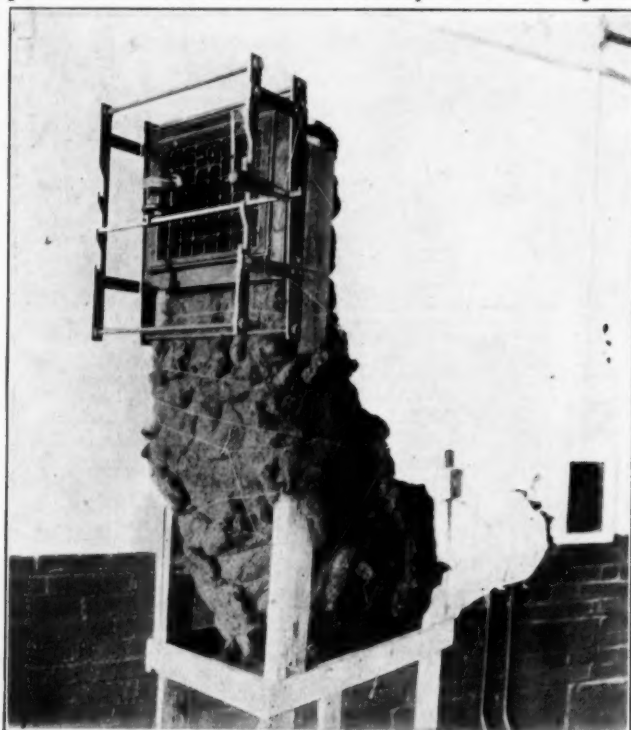
mometer, and a series of these readings connected by a curve. If the couple is then used at some other place, and a reading of 3.00 millivolts is obtained for instance, the corresponding temperature, 164 degrees Fahrenheit, may be read from the curve. In the furnace testing plant previously mentioned, one such junction is placed at each point where the temperature is required and the wires are led from it to a dial switch and a single ice bath and indicator centrally located.

In laying out a system for the measurement of low temperatures, two main problems are at once presented. They are, first the choice of the wires to be used, and second the choice of an indicating instrument.

Various combinations of metals give different magnitudes of electromotive force per degree difference in temperature. Since this temperature difference is small for low temperature work, it is advantageous to choose two metals which give a high induced electromotive force, thus increasing the precision with which

the electrical instrument can be read. At the same time the metals must be homogeneous in structure. Non-homogeneous metals are subject to stray or parasite currents, and also to permanent changes in structure. The first influences the momentary reliability of the readings and the second affects the permanency of calibration, either one of which tends to discredit the results. The most fortunate combination of these factors seemed to be possessed by a combination of copper and constantan, and these were accordingly chosen for the work previously mentioned. This combination gives a temperature change of about 42 degrees Fahrenheit per millivolt.

Two methods are generally used for indicating the electromotive force, the deflection and the potentiometer methods. The first mentioned is not independent of changes of resistance in the thermocouple circuit, and in order to reduce the error from this source it is necessary to use a high resistance galvanometer. This reduces the sensitivity of the system to such a point that it becomes unsatisfactory for low tempera-



Typical Arrangement at Register Face in Calibrating Plant for Making Anemometer Traverse.

ture work where the total electromotive force is very small.

The most convenient method to use is the potentiometer principle as embodied in an instrument called the Pyrovolter, a diagram of which is shown in Figure 2.

In this instrument the couple is connected across a fixed resistance (R_1) in such a way that its electromotive force opposes the fall of potential along (R_1). A very sensitive galvanometer (G_2) is placed in the couple circuit in series with a telegraph key. The fall of potential across (R_1) can be varied by adjusting the variable resistance (R_2). This is adjusted until (G_2) shows that no current is flowing in the thermocouple circuit, or in other words reads zero. When this is the case the electromotive force of the couple is just equal to the fall of potential across (R_1). The galvanometer (G_1) then gives the current flowing in

the main circuit when the balance was attained. Since (R_1) is a fixed resistance, the galvanometer (G_1) may be calibrated to read directly the fall of potential across (R_1) for any given current in the main circuit, or, what is the same thing, the electromotive force of the couple. The readings of the instrument are taken when there is no current flowing in the thermocouple circuit, and hence are independent of any

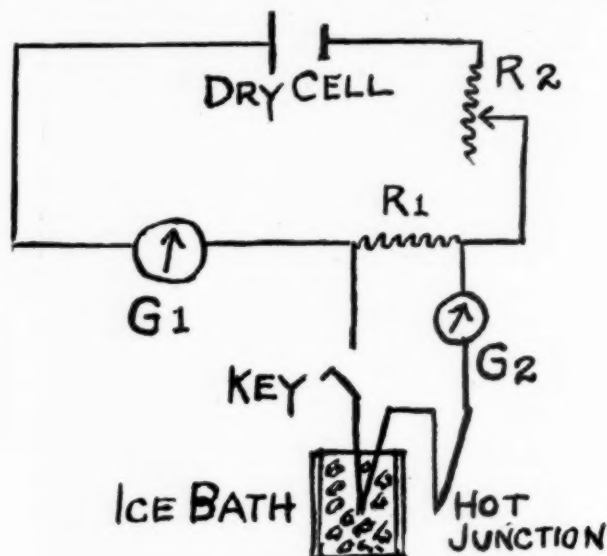


FIGURE 2

Showing Thermocouple.

change of resistance in this circuit. The degree of precision of this instrument is therefore dependent upon the accuracy of attaining the initial balance, and the precision with which (G_1) may be read. Any degree of accuracy required may be obtained by using a very sensitive galvanometer for (G_2), and by using a sufficiently sensitive galvanometer for (G_1) any degree of precision desired may be attained. For the purpose of the warm-air furnace investigation a galvanometer with a least reading of 0.01 millivolt was used. This gives a precision of 0.42 degrees Fahrenheit, which was considered sufficiently accurate for this investigation.

TESTS OF WARM AIR FURNACE INSTALLATION DETAILS.

By V. S. DAY,

Research Assistant, University of Illinois.

In addition to the work of testing various types of furnaces the Investigation of Warm Air Furnaces covers other phases of furnace installation. Principal among these are the accurate determination of the heat losses from various types of installations, and the measurement of the amount of air delivered at the registers in the various types. This determination involves the testing of many different heat insulating materials, and the measurement of the effect of pipe fittings upon the velocity of flow of warm air in leaders and stacks. The ultimate goal to be reached is the valuation of the heat delivering capacity of the pipes used in furnace heating.

The apparatus used in this work consists of a special furnace which has only one outlet for the dis-

charge of the heated air. The sectional elevation, taken from Engineering Experiment Station Bulletin No. 112, illustrates the features of its design.



V. S. Day, Research Assistant, University of Illinois.

The furnace is light and portable and therefore lends itself readily to quick changes in the arrangement of

furnace proper is reduced to a minimum. In its operative details the heater differs somewhat from the ordinary furnace. It is heated by steam, and the condensed steam, which is weighed, is a direct measure of the heat supplied to the air. The heat value of the steam is readily determined by the use of a calorimeter and gage. Variation of the heating capacity is made by throttling the steam and further by shutting off sections of the heating coils. Further details regarding this piece of apparatus may be seen in the illustration.

Many tests have been made with this apparatus and important results obtained. The results show among other things that leaders and stacks of equal cross sectional area have little more air carrying capacity than combinations in which the stack has only three fourths the area of the leader. The heat loss from heat pipes varies almost directly with the surface area of the pipe exposed. Some results of these tests were read at the annual meeting of the Warm Air Furnace Manufacturers' Association last June. Additional data is now available but will not appear until published by the University or the Association.

The data on heat loss was regarded as important enough to justify the setting up of additional special apparatus for the testing of furnace insulating materials. This very interesting apparatus has made possible the determination of the absolute, as well as the relative, heat insulating properties of asbestos preparations, paints, metals, and air spaces. Information regarding these tests which indicate that present methods of insulating leader pipes are very inefficient, will be published soon; after the bearing of the data upon furnace installation has been fully established.

RECOMMENDS CLOSE ATTENTION TO PRACTICAL INSTALLATION.

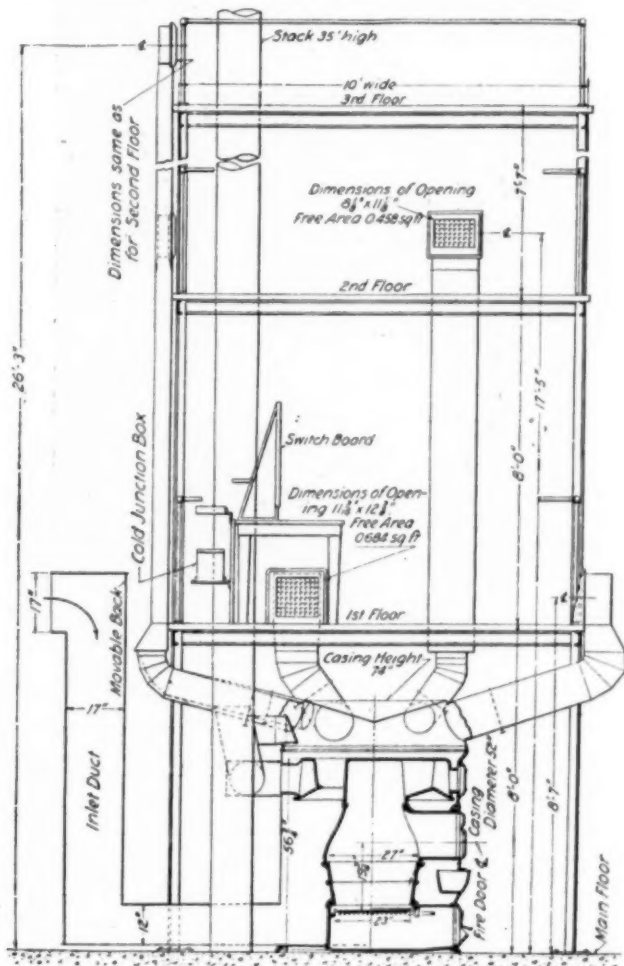
By WARD E. PRATT,

Special Investigator and Research Associate, University of Illinois.

In response to the question concerning humidifying apparatus, I most emphatically recommend a humidifying apparatus that will evaporate much more water than the average water pan set anywhere in the warm air heater casing. The average water pan does very little good. The writer is now testing out in a house warm air heater with fifty-four inches diameter casing, a special water pan that extends around the firepot next to the casing from front to front, with an evaporating surface of about two hundred and seventy square inches.

Professor Pratt is in favor of taking cold air from the floors inside of the house without an auxiliary cold air intake from the outside. He was one of the heating and ventilating engineers who advised the Chief of the United States Housing Commission to employ this system.

I am in favor of taking cold air from the floors inside of the house without an auxiliary cold air intake from the outside. In fact, I was one of the passes to an upstairs riser, I would say that if leader pipe to second or third floor is so short that to all intents and purposes it is above the warm air heater—



SECTIONAL ELEVATION OF FURNACE TESTING PLANT

the connecting leader pipes and stacks. It is heavily insulated, and has double walls between which the entering air passes. Thus the heat loss from the

that is, when such a leader pipe must have a pitch of more than forty-five degrees—then such a leader should be taken off the opposite side of the warm air heater. This puts two elbows into the line and introduces enough friction so that the system will not be unbalanced and all danger of direct radiation from the heated castings up to the boot will be eliminated.



W. E. Pratt, Research Associate, University of Illinois.

In regard to State laws governing the installation of warm air heaters, I am of the opinion that such legislation is not worthy of approval unless laws can be passed which are in accordance with findings from the Warm Air Heater Research Department of the University of Illinois, and in collaboration with a committee of engineers from the manufacturers of the National Warm Air Heating and Ventilating Association. I approve the licensing of warm air heater installers by the State.

Keeping in touch with the practical as well as the technical side of the industry, I should say that the manufacturers can help the retail trade increase sales by instructing the dealer how to put the plant in right and by instilling pride of work into the dealer. I advise a sales service which would make the dealer want and try to get a letter of recommendation from every customer, photograph of house and job, and record of operation of heating plant for future sales work.

OFFICERS OF ORGANIZATIONS IN THE TRADE PRESENT VIEWS ON WARM AIR HEATING INDUSTRY.

It is generally conceded throughout the warm air heater industry that the men in charge of the national organizations within the trade have done much to advance the interests of all concerned. Their judgment of conditions and tendencies is the product of a mature wisdom and wide practical experience. The following letters are, therefore, worthy of close perusal and consideration:

Letter from Arthur P. Lamneck, President National Association Sheet Metal Contractors, Columbus, Ohio.

TO AMERICAN ARTISAN AND HARDWARE RECORD:

The business outlook offers not the slightest encouragement to pessimism. Only the observer of affairs and tendencies whose liver is functioning far below normal can find warrant for gloomy forebodings. I am absolutely on the bright side for the future. Whatever shadows there may be of labor disturbances and sporadic outbreaks of radicalism merely accentuate the radiance of America's prospects for the coming year. Enough information is already at hand to justify the statement that this year's business will be much greater than last year's business. More warm air heaters are selling in every part of the land. The people are gradually becoming educated to a recognition of the superior advantages of the warm air heating system.

There is a range of usefulness within whose limitations the pipeless warm air heater may legitimately claim to be of service to the householder. I am quite confident that the pipeless warm air heater will not harm the regular line. My advice to the trade would be to make greater preparations for business in 1920,



Arthur P. Lamneck, President National Association Sheet Metal Contractors.

and to make them early. This advice is not actuated by mere enthusiasm. It comes from data gathered in various parts of the country. The warm air heater dealers and installers who put themselves in a position to handle the trade will reap the harvest of profits. But they must arrange for a supply of materials from the jobbers and manufacturers. And this they must do far enough ahead in point of time to be assured of an adequate supply so that they may be able to take care of the increased volume of business.

I am heartily in favor of collective publicity for the purpose of educating the people in favor of the warm air heater. Much of the objections which operated

in the past against the wider adoption of the warm air heating system came from the use of warm air heaters which were not adequate to the requirements of the buildings in which they were installed. Almost invariably the house owners want good warm air heaters, while speculative builders demand the cheaper grades. I am in favor of State laws governing the installation of warm air heaters for the reason, among other reasons, that such laws properly devised would prevent the installation of warm air heaters not suitable to the requirements of a particular dwelling. The matter of licensing warm air heater installers by the State is a subject of considerable controversy in the trade. Personally, I think it advisable. I agree with Government experts in recommending that cold air be taken from the floors inside the house. I believe that this is the general opinion of the trade and that it is substantiated by practical experience.

In closing, I would urge upon all dealers and installers that they become members of the National Association of Sheet Metal Contractors, and through the cooperation of this progressive organization derive benefits which are not obtainable by individual effort.

ARTHUR P. LAMNECK,

President, National Association Sheet Metal Contractors.

Letter from E. B. Langenberg, Chairman Warm Air Heater Committee National Association Sheet Metal Contractors.

TO AMERICAN ARTISAN AND HARDWARE RECORD:

It is generally during the rush of business when one's thoughts are crowded with everyday practical facts, that opportunities often present themselves.



E. B. Langenberg, Chairman Warm Air Heater Committee, National Association Sheet Metal Contractors.

What I mean is, that the dealer, by coming in contact with so many heating plants, has the opportunity to test out the theory, prove a fact, provide a remedy, or suggest an improvement that will not only benefit the customer, but at the same time be a benefit to himself and the trade.

If a dealer, be he conscientious in his business and in his treatment of the public, will make a note of these facts as he meets them in his daily practice, and, when the season is over, tabulate the results, he will find that he has assembled a store of knowledge which will benefit his practical knowledge and put him in the position of offering better service to his customers.

It is during the active hours of the usual Fall rush when a man in the heating business is firing on all six cylinders, with brain power on the alert, that new ideas are born.

Too many men are interested in the pennies of the present, and overlook the dollars of the future, which they should be able to secure through the increased efficiency and knowledge acquired in the present rush season.

The Warm Air System of Heating is *here to stay* because of the great possibilities in ventilation that can be combined with it.

The Sheet Metal Contractor is the logical man to do the installation work, and he can increase the use of the warm air system to a very great extent by going after the business in a very systematic way. What I mean is, by such things as a window display where it is possible, during the Summer and Fall months, by keeping his name constantly before the public in his own vicinity as an installer, and last but not least, by constantly studying, so as to keep posted with the latest methods, both in theory and practice to the end that he can give the public a real service, and build a name for himself in efficiency and ability.

The opportunity is *now* and not tomorrow or next week. Make it. Don't wait for it.

Yours truly,

E. B. LANGENBERG,

Chairman Warm Air Heater Committee, National Association Sheet Metal Contractors.

Letter from Edwin L. Seabrook, Secretary National Association Sheet Metal Contractors.

TO AMERICAN ARTISAN AND HARDWARE RECORD:

A few days ago I heard a Red Cross worker telling some of her experiences in France. She related what one negro soldier boy said to her when questioned as to what he expected to get out of the war, which was: "Missus, dere's only one thing I wants to get out of dis yere war, and that is to be a survivor."

Applying this homely saying of the colored soldier to the warm air furnace installer, it is to be presumed that he wants to be a business survivor, and deserves to be. Complying with your request, to say something for your "Warm Air Heater Special," I feel I can touch upon no more pertinent phase of the situation than permitting the installer to survive. Probably every other phase, proper installation, proper manufacturing methods, what the installer ought to do, how he ought to do it, the manufacturer likewise, will be discussed so that I would only be repeating if I should discuss any of these or attempt an outline of the conditions of the trade.

Permitting the installer to survive is neither a joke nor a theory. In some instances it is becoming a serious fact. There is a proper line of distribution of the manufactured product by which it ought to reach the

consumer. This proper line is from the manufacturer down to the retailer, using the wholesaler, branch supply house, or agency, where an intermediary is necessary, or desirable, as a matter of convenience. When this line of reaching the consumer is disregarded some one is bound to suffer and needlessly so, because it does not help the interest above the one who has suf-

fered the loss of business that rightfully belongs to him. In other words, the financial gain to the source of supply in the long run has not been increased by disregarding the interests of the one who rightfully should supply and serve the consumer. In the warm air furnace business it is the installer who should serve the consumer, and not the manufacturer, direct from his foundry, or through installation branches or department stores.

Will the installer be permitted to be a survivor?

Yours truly,

EDWIN L. SEABROOK,

Secretary National Association Sheet Metal Contractors.



Edwin L. Seabrook, Secretary National Association Sheet Metal Contractors.

Letter from Allen W. Williams, Secretary National Warm Air Heating and Ventilating Association.

TO AMERICAN ARTISAN AND HARDWARE RECORD:

The general business outlook for the coming year is good if the promised trade is not hampered by unreasonable demands from labor and heavy advances in the cost of materials.

Dealers and manufacturers are for the most part convinced that costs will be no less, and this assurance removes one uncertainty with which we were confronted early in the present year.

The demand for warm air heaters during 1919 has absorbed the production which has been at a rate under normal, and this curtailment of output has probably caused an impression that the trade has been unusually heavy.

No particular section of the country has enjoyed a distinctly larger increase in sales than any other.

As to the pipeless warm air heater, whenever extravagant claims have been made for it, they have hurt the one register warm air heater itself much

The matter of establishing installation branches by the manufacturers of warm air furnaces received the serious consideration of the Columbus Convention, last June, of the National Association of Sheet Metal Contractors. That convention went squarely on record as opposing the practice of establishing purely installation branches and catering to department stores. Perhaps the installation branch, so far as service to the consumer is concerned, is a lesser evil than the department store, because the former may exercise some scientific knowledge in installing the furnace, but the department store generally passes it on to the consumer who can get it put in by the carpenter or a "handy man."

Following the action of the Columbus Convention, its attitude was sent to every furnace manufacturer in the Country, with a request that he express himself on this question, vital to the installer, regarding the distribution of his product. Some emphatically put themselves on record as opposing the practice and some—well, some have never acknowledged the two letters that went out on this subject.

It seems unnecessary to prolong the argument. Shall the furnace installer be a survivor in the distri-



Allen W. Williams, Secretary National Warm Air Heating and Ventilating Association.

more than the system as a general proposition, as the latter is now recognized as the best system for dwellings and smaller public buildings. In this connection it seems perfectly proper to count the installation of a pipeless for the purpose of heating a job beyond its limitation, as defective installation. Installation as a whole is showing an improvement since

the dealers have become more familiar with the evils of defective installation.

The engineering research work carried on for the past two years by the National Warm Air Heating and Ventilating Association is beginning to furnish more reliable engineering data, some of which has already become available, and which will more rapidly develop from now on.

The collective publicity campaign as carried on by the Roofing, Metal and Heating Engineers of Philadelphia is to be commended to every locality. It is economical to the individual contributors as well as profitable to them. Such a campaign of publicity need not interfere in the least with the desire of the individual dealer to exploit some particular make of warm air heater in connection with same.

Some good authorities endorse the policy of licensing warm air heater installers by the State, as well as State laws governing the installation of these goods. The proper licensing of installers would undoubtedly improve installation. The State laws referred to might meet with more general approval if there was not the danger of their sometimes being unreasonable and impractical and used as a means for building up a political machine or advancing the interests of some particular class.

The use of a special Humidifying apparatus in connection with a warm air heater job is very justly becoming more and more popular and it would be helpful to good results if the general public could be impressed with the desirability of proper humidity.

No revolutionary improvements in warm air heaters have appeared during the year, although the manufacturers are constantly working out changes which make for economy in fuel and greater efficiency.

As time goes on the different fields of Steam, Hot Water and Warm Air Heating are becoming more familiar to the general public, although the dealers and manufacturers of warm air heaters must constantly be aggressive if they are to secure their just share in competition with the wide awake makers of Boilers and Radiation.

Yours truly,

ALLEN W. WILLIAMS,
Secretary National Warm Air Heating and
Ventilating Association.

Letter From Professor John R. Allen, Director American Society of Heating and Ventilating Engineers' Bureau of Research, United States Bureau of Mines, Pittsburgh, Pennsylvania.

TO AMERICAN ARTISAN AND HARDWARE RECORD:

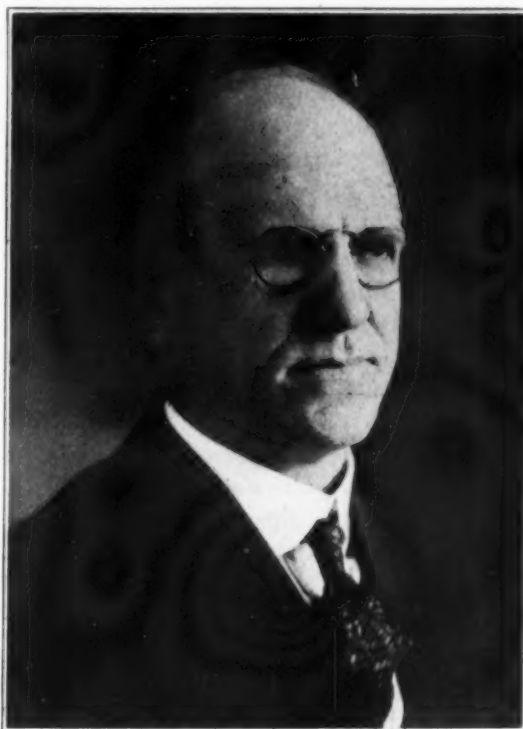
In compliance with your request for a summary of the work of the Bureau of Research of American Society of Heating and Ventilating Engineers in the United States Bureau of Mines Laboratory, Pittsburgh, Pennsylvania, I would say that it is divided into three distinct branches:

First—*The collection of all existing data and records.* We are now making a complete card index of all existing data bearing on research work that has been done along the heating and ventilating lines. This card index will be kept in this office and any members of the Society desiring a bibliography on any subject in connection with heating can write here and obtain

the information along the line desired. The work in the course of time will undoubtedly be of great service to the heating profession.

Second—*The standardization of all instruments and methods of testing.* This work will be carried on from time to time in connection with our research work and the methods will be submitted to the Society for their approval. The present standards adopted by the Society will also be investigated by the Bureau and will either be approved or revised so that the Bureau can approve them. This work is now being carried on at Pittsburgh.

Third.—*Research work.* This work will be done both at the Laboratory at the Bureau of Mines and at other institutions, particularly the universities which have facilities and are willing to assist in the work of



Professor John R. Allen, Bureau of Research, Pittsburgh, Pennsylvania.

the Bureau. The Bureau is now carrying on work at the University of Minnesota, Carnegie Institute of Technology, Pittsburgh, and expects to carry on work at Pennsylvania State College. It is also very much interested in the work that is now being carried in the research department at the University of Illinois in connection with warm air heaters. This work is developing some very interesting methods and will undoubtedly result in the establishment of some standards. One of the most interesting phases in the work of the University of Illinois is that of the development of a satisfactory method of determining the air flow at low velocities.

At present the Bureau at Pittsburgh is working on certain special problems, principal of which are:

(1) Determination of what constitutes ventilation; in other words, what are the basic conditions that will give proper health and comfort to human beings. This work of course will involve a long series of investigations and it may be a number of years before standards are laid down for air conditioning.

(2) Tests of direct radiation. This subject has al-

ready been pretty thoroughly covered in most of its phases, but it is proposed to combine the work of the various well-recognized authors and experimenters so that all existing data may be easily available for engineers. In pursuing this work at the present time a very interesting question has come up as to the desirability of heating by radiant heat or by convected heat, and the Bureau is making investigation of the amount of radiant heat and convected heat that is given off in the different forms of radiators.

We also propose to go still further and determine as far as possible, the relative physiological effect of radiant and convected heat. This is particularly interesting to the persons concerned in hot-air heating as in this type of heating all the heat is given off by convection.

(3) The determination of infiltration. It is very essential in determining the heat loss of buildings that we have some idea of losses by infiltration in the average building. The Bureau is now working on the method of determining the amount of infiltration and later on will try to determine the range of infiltration in ordinary building construction in order to lay down some standard which can be used in determining infiltration losses.

(4) The determination of heat losses through various building materials. There is much data already available in this field and it is proposed by the Bureau to collect this and to add such data as is necessary to make our tables complete.

(5) Investigation of proper sizes of steam piping for direct radiation, particularly with a view of the possibility of saving pipe as far as possible.

The Bureau is just starting and it will take some time to accumulate the necessary instruments and apparatus to carry on this work. During the period of development the Bureau is making a study of the literature bearing on heating and ventilating research, so that it will have the benefit of the work that has already been done in the various subjects it is undertaking.

The great aim of the Research Bureau is to derive exact information of an accurate nature which can be used in developing the art of heating and ventilating. At the present time much of our information is not exact and some of it in error. There is much information which has been derived by computation and not by experiment so that its accuracy can be seriously questioned.

It is not the intention of the Bureau to test one radiator in comparison with another or one boiler in comparison with another, but rather to assist the heating and ventilating engineer in improving and developing the art by knowing the truth as far as it is possible to obtain it.

Yours truly,
JOHN R. ALLEN,
Director Research Bureau of American Society of Heating and Ventilating Engineers.

A. W. Glessner of the Excelsior Steel Furnace Company, Chicago, Illinois, is rustivating at the Homestead Hotel, Hot Springs, Virginia. Mr. Glessner is taking a much needed rest from his arduous labors.

DOCTOR DECLARES THAT HEATING, VENTILATING AND HUMIDITY ARE VITALLY NECESSARY.

Humidity, ventilation, and heating have a preponderating effect on the normal functioning of the human body. Many investigations prove conclusively that the physiological actions of the various organs of the human body are directly traceable to the supply of proper air. Increased efficiency in mental work is insured by providing proper ventilation. However, the acuteness of the influences of humidity, ventilation, and heating are brought out in astounding clearness by Ellsworth Huntington, Ph. D., of the Yale University. Writing in *Modern Medicine*, a medical journal, on the subject of Air Control and the Reduction of the Death Rate after Operations, he says: "An improvement of 20 per cent in the result of operations would be an achievement for which the world might willingly pay millions of dollars. Yet such an achievement seems to lie easily within our grasp. It could apparently be brought about simply by giving the air of hospitals and sick rooms the proper temperature, humidity and variability. Although such a statement sounds highly optimistic, it seems justified by an abundant evidence."

Paradoxical as it may appear, that such neglected factors as heating, ventilating and humidity should have as weighty an influence in determining the success of an operation, Dr. Huntington presents much scientific data proving it. At the time of operation, it has been found, humidity and variability of the air have a great deal to do with the successful performance of the surgical work. In this respect Dr. Huntington states: "The problem is to determine whether the condition of the air at the time of operation and immediately thereafter has anything to do with the success of the operation. The answer is emphatically positive. Deaths after operations show, not only the familiar seasonal variation due largely to temperature, but also an equally strong relationship to humidity and to variability."

The bearing of heating, ventilation and humidity in so delicate a performance as operating on the human body—often in the most extremely difficult circumstances—brings more plainly in view the vital need of governing these factors for the best interests of health.

Dr. Huntington also emphasizes the constant need of humidity to safeguard and insure health when he says: "The evidence that health could be improved by proper humidity seems overwhelming. So, too, does the evidence that the human organism is amazingly sensitive to slight changes in the atmosphere."

In the light of recent scientific investigation the superiority of heating combined with ventilation is again emphasized in stentorian tones. That this incessant proof of the supremacy of a system which heats and humidifies the air consumed by the inhabitants of the house in which it is installed, will sooner or later have its effect on the general public, is a foregone conclusion. Dealers alive to the facts in favor of their business will find many pointers which can be used to advantage in sales talks on warm air heaters.

Warm Air Heater Producers and Distributors Analyze the Conditions of the Trade.

The following letters are the views gleaned from a number of answers received from manufacturers and jobbers in all parts of the country on all topics concerning the warm air heating industry. Contained herein will be found information of great value to the trade. Among other things, there are discussed from various points of view methods of installation. Studying industry and the general business situation from their portion of the country, each manufacturer or jobber presents his opinion on the commercial outlook for the coming year. All in all, these letters will be found both instructive and encouraging to the trade:

From the A. B. Stove Company, Battle Creek, Michigan.

We notice an increase of 200 per cent in warm air heater sales for 1919, chiefly in the central states. The pipeless warm air heater will not injure the warm air heating business when sold by experienced and reputable companies, but every manufacturer should carefully select his agents and use some means to control their sales. Defective installation is decreasing. The trade demands better grades of goods. Dealers do not make adequate use of manufacturers' advertising helps. We do not believe in collective publicity as variously set forth. We do not approve of State licensing of warm air heater installers. State laws governing the installation of warm air heaters are only an added burden on the industry and the consumer without any resultant benefits. The taking of cold air from the floors inside the house is a correct method of intake. Automatic humidifying has some objections. It is not likely to be kept properly cleaned. A large water pan set in the front of warm air heater, under or over the feed door, is best. Our agency contracts provide that no warm air heater shall be installed until a plan of the house has been submitted to our engineering department and they have passed upon it and have furnished an installation plan. The agent must agree to install the warm air heater in accordance with the plan.

**From The American Furnace Company, St. Louis,
Missouri.**

We expect next year to be the banner year for the warm air heater trade, especially so if the prices of labor and material settles on a fair basis to all concerned. We are booking more orders than last year. Most of our trade is recorded in the East. The pipeless warm air heater is an improvement over stoves as a Ford car is over the horse. Most dealers are familiar with the evils resulting from defective installation. The better grades of warm air heaters are mostly in demand. We have both grades to offer to retailers. In our opinion, there is only one means of permanently increasing the dealers' sales and that is by the sale of the best possible line of warm air heat-

ers to be found. Customers who have them properly installed are boosters, and the longer the goods last without repairs, the longer and harder they boost. We advise the manufacturers to eliminate the cheap, troublesome and repair making warm air heater through some association. We do not approve of State licensing of installers. If properly made to cover many present defects in warm air heater installation, we are in favor of State laws governing the installation of warm air heaters. Taking all in all, the air from the first floor is satisfactory if the cold air pipe is of proper proportions and given proper gradual fall all the way from the cold air register to the warm air heater and kept so that the warm air heater can not heat it. Set the register, if possible, to give a 45 degree fall to the warm air heater intake. However, we believe that in about 25 per cent air being added. This would liven up the circulation and provide better air. The ordinary water pan is sufficient to provide humidity. We have added smoke shields to the warm air heater we manufacture, namely, the American Boiler Plate Warm Air Heater. We shall have a pipeless ready for the first of the year. Hot water or steam heating is not in any way affecting the warm air heater field.

From J. F. Anderson, Niagara Falls, New York.

Business outlook is good. Our sales are about same this year as last, mostly in Pennsylvania and Ohio. The pipeless will never injure the warm air heater business. Better grades of warm air heaters are in demand. Dealers do not make sufficient use of manufacturers' advertising helps. We believe in collective publicity. We approve of licensing warm air heater installers by the State. It is all right to take cold air from the floors inside the house. If attended properly, we recommend a special humidifying apparatus. We have made some improvements in our warm air heaters during the past year.

**From the Brien Heater Company, Westfield,
Massachusetts.**

If labor is reasonable, business should be normal in 1920, and should boom thereafter. We believe the pipeless is injurious to the business on account of the impossible result guaranteed by irresponsible dealers and misleading advertising of some manufacturers. The average percentage of depreciation for warm air heaters over a period of years is about five per cent in the better class of heaters. Retailers as a whole are familiar with the results of evil installation. Our trade is 100 per cent of the better grade. We decidedly are in favor of cooperative advertising—especially through the National Warm Air Heating and Ventilating Association. We do not approve licensing warm air heater installers. State laws governing installation of warm air heaters would be desirable if

compiled by *practical* people. We recommend a special humidifying apparatus. The average water pan is inadequate. We have perfected a humidifying apparatus on our line of goods which will supply sufficient moisture to the rooms heated.

From the Chandler Heater Company, Cedar Rapids, Iowa.

We think the general business outlook is very good. This is our first year in the warm air heating business. Our sales so far are 100 per cent greater than we anticipated. We believe the pipeless will injure the warm air heating business. Not all retailers are familiar with the evils resulting from defective installation. In certain localities a better grade of products is demanded. We help the dealers by advertising locally. However, we do not believe they make full use of advertising helps. We do not approve of State licensinb of installers. Neither do we favor State laws governing the installation of warm air heaters. We believe that taking cold air from the floors inside the house is all right, but we recommend an auxiliary cold air intake to freshen the air several times a day. The water pan is inadequate to provide sufficient humidity to the air. Because of the high prices of steam and hot water heating, these branches of heating industry are not affecting the warm air heating business.

From a prominent manufacturer in Canada.

The business outlook for the coming year is excellent. Our sales have increased 25 per cent over those of 1918. We think it probable that the pipeless warm air heater does injure the warm air heater business. On first class constructions the depreciation for warm air heaters over a period of years is not more than five per cent. Defective installation is decreasing. The better grade of goods is more in demand from us. We do not approve State licensing of installers. Nor are we inclined to favor State laws governing installation of warm air heaters. No general rule can apply to the distance between the warm air heater and the floor area. We agree with the experts—cold air should be taken from the floors inside the house. We have equipped our pipeless line with large circulation water pans set in the casing. Other systems of heating are not affecting the warm air heating business.

From the Campbell Heating Company, Des Moines, Iowa.

As a whole, the general business outlook is fine. Building will be above normal for from two or five years. Our sales for the first half of the year were about half of that of 1918; for the same period since July 1st it doubled and trebled. People will gradually come to understand the pipeless warm air heater and will use it with discretion. Defective installation is gradually being lessened. It does not pay to advertise collectively. We are not in favor of State licensing of installers, nor of State laws governing installation of warm air heaters. We believe that taking cold air from the floors inside of the house is the only sensible way in the ordinary residence. The public is more and more beginning to understand the defects of hot water and steam heating systems and this branch of industry does not affect the warm air heating field.

From the Detroit Stove Works, Detroit, Michigan.

It will be a wonderful year, provided labor troubles are settled. Building operations will continue to be

large. Most of our sales are recorded in the Middle West. The pipeless warm air heater is not injuring the business as a whole. Defective installation is decreasing. Better grades of goods are in demand. By greater advertising and sales promotion the dealer can be materially aided. We think retailers make adequate use of advertising helps sent them. Cooperative advertising to educate the people in favor of the warm air heater would be advantageous. To take cold air from the floors inside the house would save fuel. A special humidifying apparatus in connection with warm air heaters is better than the ordinary water pan. The warm air heating business is growing by leaps and bounds.

From The Excelsior Steel Furnace Company, Chicago, Illinois.

The business outlook is excellent. Building has resumed and is above normal at present. In the country better grades of goods are demanded. By employing practical installers for salesmen, the dealer can be aided to increase sales. We believe in persistent cooperative advertising. Licensing of installers by the State would be all right if divorced from politics. Provision for outside air in connection with inside circulation should be made. Special humidifying apparatus is required by some heaters and not by others. Both dealers and consumers are beginning to realize the value of warm air heaters when properly installed.

From the Hammond Heating Company, Cincinnati, Ohio.

Business has been favorable since the first of July, most of our sales being in Ohio and the South. We do not believe that the pipeless will do much harm to the warm air heating business. Depreciation on warm air heaters is about five per cent. Defective installation is decreasing. The demand is for better grades of goods. We are of the opinion that collective publicity would be advantageous. State laws governing installation would not be desirable. Double wrapping of asbestos or double pipe should be used on warm air ducts. We agree with the government experts, that cold air should be taken from the inside of the house. Water pans are sufficient to provide ample humidity.

From a prominent manufacturer in Ohio.

We are so busy that we hardly expect to be able to fill all of our orders. The bulk of our sales are recorded in Ohio and Pennsylvania. The pipeless does injure the warm air heating business. We sell more of the better grade of warm air heaters. The dealer can be aided through employing competent salesmen. State licensing of installers might be a good plan. Warm air ducts should be covered with asbestos paper. The method of taking cold air from the inside of the house is a good one. A water pan is all that is necessary, to provide moisture to the air. Other systems of heating are in no way affecting the warm air heating business.

From a prominent Ohio manufacturer.

Barring labor uncertainties, business outlook is good. Sales have increased over those of 1918, mostly in the Middle West and North Central States. Better installation is becoming the rule among dealers. We do not approve of licensing installers, and there would

be too much so-called regulation were laws enacted to govern installation. We believe it not advisable to install warm air ducts without giving them an upward slant. The distance between the warm air heater and the floor depends upon the make of the heater and the insulating methods. Special humidifying apparatus is only an unnecessary expense. We do not feel the effect of other heating systems in our territory.

From the John Grossius Furnace Company, Cincinnati, Ohio.

Business outlook is very good. Our sales are much better than last year and the greatest portion of them are made locally. We regard the pipeless as a joke. The average depreciation is very small. Defective installation is decreasing, we think. The water pan is ample to provide humidity. The constant demand for fresh air favors the warm air heating field.

From a prominent manufacturer of New York City.

So far business is fine. Our sales are proportional in all sections. In some cases the pipeless is injurious to the general business, but as a whole it is not. Our demand is mostly for the standard type. The space between the warm air heater and the floor above it should be at least 18 inches. We approve taking cold air from the floors inside of the house. It is our opinion that no special device is necessary for humidifying the air.

From the Homer Furnace Company, Homer, Michigan.

Business outlook is encouraging; sales are steadily increasing, chiefly in the Central States. In our opinion, the pipeless will have a tendency to simplify all warm air heating. Cities demand a cheap grade; rural districts are best. There is too much competition among manufacturers to think of effective cooperative publicity. Certain regulations should govern installation. We have never noticed any effect of hot water or steam heating systems on warm air heater business.

From a prominent Missouri manufacturer.

The business is in full blast now. Orders are coming from all parts of the country. We think the pipeless does injure the warm air heater business. On steel warm air heaters the depreciation is about five per cent. With regard to defective installation, the situation remains the same. Owners demand a better make of heater than do builders. Cooperative publicity would be a good thing. Present data is not sufficient to simplify uniform regulation of installing warm air heaters by law. We believe that cold air should be taken half from the outside and half from the inside of the house. A special apparatus is preferable—automatic if possible—to insure sufficient humidity. There is no noticeable effect of other heating systems on the warm air heating field.

From the W. E. Lamneck Company, Columbus, Ohio.

Business outlook for the coming year is good. Sales for 1919 are 100 per cent higher than any previous year, mostly in the Central West. The pipeless manufacturers, by claiming that their products do more than they really can, will eventually injure themselves. The average percentage of depreciation for warm air heaters, if properly installed, is 10 per cent. Defective installation in the regular line of warm air heaters is decreasing. The retail dealers as a whole are familiar with the evils resulting from defective installation.

By advertising and proper engineering service the retailer can be aided to increase his sales. We believe in collective publicity for the benefit of the trade in general. Unless there is a forced circulation, it is not practicable to install warm air ducts without giving them an upward slant from the warm air heater. Ducts should be properly insulated. In our judgment, the cold air should be taken from the inside of the house. We recommend an increase in the amount of humidity ordinarily given to the air by the old plan of the average water pan. Our business is not affected by any other system of heating.

From a prominent manufacturer in Iowa.

The general business outlook for the coming year is promising. However, much depends upon the labor situation. Sales are better this year than last. The pipeless does some harm to the general warm air heating business. Retail dealers are becoming familiar with the evils resulting from defective installation. Better grades of heaters are in demand. Retailers do not make adequate use of advertising matter supplied them. We believe in collective publicity. If licensing of installers could be fairly done, we are in favor of it. We never install warm air ducts without giving them an upward slant. In our opinion, it is unwise to take cold air from the floors in an ordinary house. The average water pan provides sufficient moisture.

From a leading manufacturer in Indiana.

Our sales are above normal. We do not think the pipeless will injure the warm air heater business. State laws governing installation would mean graft, and would work hardships on the honest dealer. Note the plumbing ordinance of Illinois. We do not approve of taking the cold air from the inside of the house. It is our opinion that hot water and steam heating systems have never affected the warm air heating trade.

From the Majestic Furnace Company, Huntington, Indiana.

We think the business outlook is good. Warm air heater sales are greater than in the previous year. It is our opinion that the pipeless does injure the warm air heating industry to some extent. Depreciation on warm air heaters averages about eight per cent. Our observation leads us to believe that defective installation is decreasing. However, retailers are not thoroughly familiar with the evils resulting from defective installation. Cheaper grades of goods are in demand. We favor collective publicity. As to the State enacting laws governing installation, we think it would be a good thing to a certain degree. Taking cold air from the floors inside of the house, in our belief, is the correct method. The water pan installed in the average warm air heater is sufficient to supply humidity in proportionate amounts, if properly used. We have made some improvements on our line of products.

From a prominent manufacturer in Iowa.

Building operations are proceeding fine, and the general business outlook is good. We think that the pipeless certainly is injuring the business as a whole. Better grades of warm air heaters are in demand. A few of the dealers make full use of the advertising helps sent them; the large majority does not. We

believe the time is ripe for a State law governing installation. Some warm air heater manufacturers claim that if a large chamber is left above the heater will not need much raise, but our experience has been that the more raise we give our pipes the better they work. We have good success with taking cold air from the floors inside the house. As a general rule, the average pan installed in warm air heaters is sufficient to provide humidity. We find no inroads caused by other systems of heating.

From a Michigan manufacturer.

Business outlook is good. To a certain extent, it is our opinion, the pipeless is doing some harm to the warm air heating business. We think defective installation is decreasing. The general idea of collective publicity is a good one. By the manufacturers placing more representatives in various territories to aid the dealer in educating the public in the benefits of warm air heating, sales can be increased. Taking cold air from the inside of the house is all right for medium sized dwelling places, but a small pipe extended to the outside for cold air would be an advantage.

From a manufacturer at Pittsburgh, Pennsylvania.

The general business outlook is not very good for Pennsylvania—not until prices are more stabilized. It is not likely that the pipeless injures the general trade. Defective installation is decreasing in our district. Dealers in the majority of cases make use of advertising helps furnished them. Collective publicity is a good thing. Retailer can be aided by using his local advertising mediums. We do not recommend inside method of taking cold air. We have made some improvements on our grade of warm air heaters.

From an Illinois manufacturer

Our sales are considerably ahead of the previous year. Business is good in all sections. Over-enthusiasm may put pipeless where it ought to go. Our trade is on best lines. Collective publicity, if in practice would be for the betterment of the trade as a whole, we are in favor of it. Taking cold air from the floors inside of the house is a good method. It can be improved upon by introducing some of the air from the outside.

From the Modern Way Furnace Company, Fort Wayne, Indiana.

The country is still short of homes, and if labor gets settled there will be a large building boom. Consequently, the warm air heating industry will benefit. Since the use of the pipeless warm air heaters are becoming more generally known, they are not injuring the business as a whole. Retailers as yet are not thoroughly familiar with the evils resulting from defective installation. By employing more salesmen the manufacturers can materially aid dealers. We think that installation of warm air heaters is already under the supervision of the fire marshals, and, therefore, we can see no necessity of a State law. The government experts are right in recommending the taking cold air from the inside instead of otherwise. Our experience leads us to believe that the average water pan is ample to supply humidity if kept filled. We have embodied some improvements in our products. We can not see wherein other systems of heating are affecting the warm air heater trade.

From a leading Michigan manufacturer.

Our sales records show an increase of 30 per cent over sales of last year, mostly in the Central West. We believe the pipeless is injuring the industry as a whole to a certain degree. Dealers are more and more learning to make better installations. We are in favor of collective publicity to educate the public in the benefits of warm air heating. Dealers can be aided by local advertising. We believe State licensing of installers would be an advantage. A large water pan, properly located and attended to, will give the requisite moisture. Special humidifying devices are all right for those who will care for them properly. We have made many improvements in our line of goods.

From a prominent manufacturer in Ohio.

The outlook for 1920 is good because of the great demand for dwelling houses. Our sales of heaters in 1919 are 50 per cent greater than those of 1918. Our greatest sales of pipe warm air heaters are in Ohio, Indiana, and Illinois, those of pipeless, in Pennsylvania. The pipeless warm air heater will not injure the business to any extent. We would estimate the life of the average warm air heater to be 10 years. Defective installation is decreasing. A better grade of products is in demand. Collective publicity was tried unsuccessfully by the National Warm Air Heating and Ventilating Association, and we believe the time is not ripe now for a general publicity campaign covering warm air heating. We can see no advantage in the State licensing warm air heater installers; however, a State law governing installation would be a fair way of raising the standard of installation on the whole. It is not practicable to install warm air ducts without giving them an upward slant. If a warm air pipe leads from the heater to a vertical riser close to the heater we connect the warm air pipe to the side of the casing by means of an elbow. This prevents the intense radiant heat from the hot casings striking any part of the stack close to the woodwork. By this method the hazard from fires is eliminated. Taking cold air from the floors inside the house without an auxiliary cold air intake from the outside is the best system of warm air heating that we know of. One water pan set in the casing as provided in our warm air heater gives sufficient humidity.

From the Northwestern Furnace and Supply Company, Minneapolis, Minnesota.

To us the business outlook for 1920 is good. Sales are about 50 per cent greater this year than last, chiefly in Minnesota. It is our decided opinion that the pipeless does injure the warm air heater industry. There is not much change with relation to defective installation by dealers. Retailers can be aided to increase sales by manufacturers furnishing more competent salesmen. We favor licensing installers. No particular distance can be stated with regard to the space between the warm air heater and the floor. Double metal stacks with air spaces are fire preventive. We have always contended that cold air taken from the inside of the house was the proper method. A humidifier capable of furnishing 12 to 15 gallons of water is about right for the average house. We are always improving on the construction of our products.

From a manufacturer in Maine.

We believe the business outlook is good. Sales are larger for 1919 as compared with the previous year. Pipeless does injure the warm air heating industry. We doubt the expediency of cooperative publicity. Taking cold air from the floors inside the house is a method that can be made to work extremely well. The existing high prices hurt the hot water and steam heating business more than it does the warm air heating industry.

From the Peerless Foundry Company, Indianapolis, Indiana.

Indications point to normal, active building operations. Consequently, the business outlook is good. Our business has increased 300 per cent up to October 1st, 1919, principal sales being recorded in the Central States. Because too much is claimed for the pipeless warm air heater it is decidedly injurious to the industry as a whole. We believe defective installation is decreasing. There is an ever increasing demand for better grades of heaters. Manufacturers can assist retailers to enhance their sales by employing salesmen who are technical as well as practical men in the profession. As a general rule, dealers who make the warm air heating business their principal undertaking utilize advertising helps furnished them. We are in favor of cooperative publicity in the interest of the warm air heating industry as a whole. Licensing of installers would compel the dealer to become more efficient and as a result the business would be raised to a higher standard. Unless a fan system is used, we do not think it practicable to install warm air ducts without giving them an upward slant. Outside air does not eliminate foul air when there is no provision to take the vitiated air out. If kept filled, the average water pan is large enough for practical purposes; however, we recommend the automatic humidifier. We have made several material improvements on our goods. The public seems to be learning that steam and hot water installations are inferior, in the average home, to the warm air heater.

From a prominent manufacturer in Michigan.

The coming year will be the best in the history of the warm air heater industry. Our sales have almost doubled those of the previous year. The function of the pipeless is more and more becoming recognized by the general public. We do not believe as many undersized warm air heaters are being installed as heretofore. Dealers show an inclination towards more efficient installation. Price is not as much a factor in determining the grade of a heater as was the case in times past. By using a large plenum chamber some very fine results may be secured. Taking cold air from the inside of the house is a good system. In some instances, special humidifying devices are necessary. No other system of heating is affecting the warm air heater industry.

From a Wisconsin manufacturer.

The business outlook for the coming year is very good and we think it will continue for several years. We sold more warm air heaters during 1919 than in the history of our establishment, most of them being recorded in the Central States. Depreciation averages about 6 per cent or less. Through education and

intelligent and aggressive initiative dealers can be aided to increase their sales. However, they by no means make full use of the advertising help sent them. We favor cooperative advertising. A state law governing installation would be favorable if drawn up by intelligent heating men. It is not advisable to install warm air ducts without giving them an upward slant. In the matter of cold air intake, common sense must be used. An automatic device is better, but a well proportioned evaporating pan is effective is given regular attention.

From a prominent manufacturer in Ohio.

Building operation is greater than ever before. It is our belief that the pipeless will not injure the warm air heater trade. We favor collective publicity in the interest of the warm air heater industry as a whole. State licensing of installers would not be desirable. Taking cold air from the floors inside the house is not a good method. A water pan is adequate to supply sufficient humidity.

From the Security Stove and Manufacturing Company, Kansas City, Missouri.

Pipeless warm air heaters will injure the stove trade, but, in the end, will be a stepping stone to greater warm air heating business. We feel that co-ordination of the investigations and work of various bodies through the American Society of Heating and Ventilating Engineers will soon bring about more general knowledge of heating among installers and users, resulting in greatly increased use of warm air heaters.

From Charles Smith, Chicago, Illinois.

Sales for 1919 are larger than last year. When people learn what an improvement a pipeless is over a stove they will want a real warm air heater. There is entirely too much talk about defective installation. You never hear steam heating men talk about that part of their industry. I think dealers waste most of the advertising matter sent them. I believe in collective advertising in magazines and trade journals. To license warm air heater installers would be an advantage. Outside instake is the best method of cold air introduction. I recommend a humidifier near the top of the warm air heater and large enough to be of some service.

From a manufacturer in New York.

The business outlook is not clear, owing to labor unrest and extravagant demands. Sales are about the same for 1919 as they were in 1918. The pipeless, in our estimation, will injure the warm air heater business. Depreciation on warm air heaters averages about five per cent. Hot water and steam heating systems are not affecting the warm air heater industry.

From a Minnesota manufacturer.

Business outlook is good. Sales for 1919 are greater than last year, chiefly in the Northwest. The pipeless does not injure the warm air heater industry. Manufacturers, jobbers, and dealers are rapidly being schooled to make conservative recommendations with respect to the pipeless. By making warm air heaters dust-tight and thus overcoming the only logical objection to warm air heating the dealer can be aided materially to increase his sales. Dealers do not make adequate use of advertising helps, except when urged

by salesmen. All wall pipe should be double. No outside cold air supply is required for the home. The average water pan is sufficient. We have made our warm air heater a permanently dust-tight, gas-tight product.

From the Wells Furnace and Supply Company, St. Louis, Missouri.

Our sales are 150 per cent greater this year than last. Collective publicity would be beneficial. Licensing installers might be a good idea. On the ground of fuel economy, we approve taking cold air from the inside of the house. A water pan is adequate to supply humidity if kept sufficiently filled. Other systems of heating never did affect the warm air heating industry appreciably.

From the Wise Furnace Company, Akron, Ohio.

Most of our sales are recorded in the Central States. It is our opinion that the pipeless does not injure the warm air heater business to any great extent. Depreciation on the average is from 5 to 20 per cent, varying with different constructions. Defective installation is decreasing. Retailers are more and more learning the evils resulting from defective installation. We believe better grade of goods is in demand. It is not practicable to install warm air ducts without giving them an upward slant from the warm air heater. To safeguard the warm air duct which is nearest the heater it should be covered with asbestos. We favor taking cold air from the floor inside the house. The average water pan, in our opinion, will sufficiently supply proper humidity. Hot water and steam heating systems are not appreciably affecting the warm air heating industry.

From the Summit Stove Works, Morrison, Illinois.

General business outlook is good. Sales for 1919 show increase over last year, markedly in the Middle West. To our belief, the pipeless does injure the warm air heater trade. Defective installation is increasing. To help retailers increase sales, employ salesmen who have a practical knowledge of the heating industry. We favor collective publicity. If State laws governing installation are formulated by heating engineers and men of experience, we favor them. There is always sufficient cold air on inside for more satisfactory installation of cold air intake. The water pan, if of generous proportion, located where evaporation will be effective, is a satisfactory arrangement. We believe there is a great deal to be learned by the manufacturers as well as the trade if they wish to keep the warm air heater business upon the high standard which it deserves.

From the Sill Stove Works, Rochester, New York.

In our belief, the general business outlook for the coming year is good. We record an increase of 33½ per cent in sales during 1919 over the previous year, mainly in New England and Eastern New York. The pipeless, in our opinion, does injure the industry as a whole. By educating the retailer to become a better salesman, which would include greater knowledge of the product, its heating possibilities, etc., he can be aided to augment his sales. For this purpose, manufacturers should employ more salesmen who are familiar with the technical properties of warm air heaters. In the matter of safeguarding the warm air

duct which is nearest the heater and which passes to an upstairs riser, we have never experienced any difficulty in this connection. It is our practice always to use a double wall pipe. For humidity, a regular water pan is sufficient. We have made several changes in our heaters to meet climatic conditions. The hot water and steam heating industries, from our observation, are not affecting the growth of the warm air heating trade.

From the Scheible-Moncrief Heater Company, Cleveland, Ohio.

The general business outlook for the coming year is very encouraging. Our sales for 1919 double those of the previous year, principally in the Central States. The average depreciation on warm air heaters is about 15 per cent. Retail dealers are becoming familiar with the evils resulting from defective installation. We believe in collective publicity. To safeguard the warm air duct which is nearest the heater and which passes to an upstairs riser it should be well covered. Cold air, we believe, should be taken from the inside of the house. We recommend a special humidifying device. Steam and hot water installations are not affecting the warm air heating trade.

From the Standard Furnace and Supply Company, Omaha, Nebraska.

Barring labor troubles, the general business outlook is satisfying. An increase of 33⅓ per cent is recorded in practically all sections of our territory. The pipeless warm air heater, in our opinion, has injured the warm air heating business to some extent. Defective installation is decreasing in the territory covered by us. Dealers are becoming familiar with the evils of defective installation in some districts. The demand for better quality of warm air heaters is increasing. Retailers can be aided by education in proper installation. If the proper methods are employed, we favor collective publicity. In some circumstances, it is practicable to install warm air ducts without giving them an upward slant. We have made some improvements in our line of products. In our experience we can not see wherein the steam and hot water industry have affected the warm air heating business.

From the Silverton Blow Pipe Company, Silverton, Oregon.

Previous to 1918 we sold other makes of warm air heaters, but now we sell our own make and sales have increased 600 per cent. We do not think better grades of warm air heaters are in demand. We believe the pipeless warm air heater will injure the warm air heating trade if recommended to accomplish more than its ability. Therefore, we do not believe in recommending a warm air heater beyond its capacity. In dwelling houses we favor an interior cold air intake.

WORK SETS GOOD EXAMPLE.

Work and the world works with you. If you would set an example for your employees, you must yourself be industrious and energetic. They will be guided, in a large measure, by the actions of their supervisor

Dealers and Installers of Warm Air Heaters Give Expression to Their Views.

The problems of dealers and installers are vastly different from those of the manufacturer—often exactly the converse. No one will doubt that in the warm air heating industry the merit of the heater is governed, to a great extent, by the manner in which it is installed. The climatic conditions in the various sections of the country require particular methods of installation. Then there are the whims of the house owners to contend with in planning a layout. Many theories are disproved in actual practice. Moreover, the way in which various retailers and installers renew their list of prospective purchasers is an interesting study. In the letters herewith, some of the many received from dealers and installers in all portions of the country, will be found interesting opinions on many of the phases of the warm air heating industry from the retail point of view.

From A. R. Ashbaucher, Decatur, Indiana.

I do not keep a mailing list of my customers. Long term credits lengthen the time for the realization of the profit, hence I am opposed to it. Sales are nearly double over the previous year. The pipeless warm air heater is not injuring the warm air heater industry in this district. I always use two or more cold air pipes. State laws governing installation would be a good thing.

From an Installer in Illinois.

I use all publicity matter sent me by manufacturers to push my sales. I consider window displaying of warm air heater products as practical and gainful. Defective installation has not hampered the trade in this territory. If looked after regularly, the average water pan provides sufficient humidity. I favor an inside intake of cold air.

From S. J. Bund, Republic, Ohio.

We keep a mailing list of our customers. Window displays are helpful when they are in some way connected with newspaper advertising. Our records show an increase of 90 per cent in sales over the year 1918. Better grades of products are in demand. As a rule, retailers employ competent help to install warm air heaters. One layer of asbestos is adequate to insure protection for warm air pipes.

From C. M. Acuff, Wichita, Kansas.

I am opposed to long term of credits, because we must pay our labor each week and must meet the bills for our material within 10 to 30 days. I do not make any use of advertising helps furnished by manufacturers. Other systems of heating are not affecting warm air heating.

From the Atlantic Sheet Metal Works, Atlantic, Iowa.

A special sale about twice a year, we find, is a good method of getting new customers. Also, by continually hustling the business can be made to increase. We meet the manufacturers half way in all their ad-

vertising. Two years ago 50 pipeless warm air heaters were sold in this vicinity; last year about 25 were sold. If manufacturers will do their part as well as AMERICAN ARTISAN AND HARDWARE RECORD has, we will see a big change in this industry for the better.

From an Installer in Indiana.

We consider it practical to employ window arrangements of warm air heaters. Most dealers are on the job themselves and see that it is done correctly. However, some retailers who employ men never see the job done. The demand for thermostats or automatic devices for regulating the temperature of the warm air heater is very small.

From V. B. Edie, Warren, Ohio.

I consider long term credits the "Right Road to Bankruptcy." Better grades of warm air heaters are not in demand. My opinion is, the pipeless warm air heater is not injuring the industry. I consider the indoor intake the only method of supplying cold air. Hot water and steam heating are in no way affecting the warm air heating industry.

From J. W. Dyer, Morristown, Tennessee.

Because the pipeless warm air heater is not handled by competent heating men it is proving to be a hindrance to the warm air heater business as a whole. I do not believe that it should be recommended in place of a regular heater.

From C. F. Bemis, Ruthton, Minnesota.

The pipeless warm air heater is less hazardous with regard to fire than the regular makes of warm air heaters. I would prefer all cold air being taken from the inside. State laws governing installation would be satisfactory. Likewise, State licensing of installers would better the standard. Hot water and steam heating industries are not affecting the warm air heating industry.

From O. M. Bonson, Lewiston, Idaho.

I have a general mailing list which is used for all practical purposes. I use cuts furnished by manufacturers. Picture show announcements bring inquiries. Legitimate dealers will not be injured by the pipeless warm air heater. One question that should be asked of installers is: How much coal would be saved by use of the pipeless warm air heater as compared with the regular heater.

From the Thomas Baird Company, Kankakee, Illinois.

We get a new line of customers by advertising and by the satisfaction given by our work. We exploit advertising conducted by the manufacturer by pointing out to prospective customers the points of favor contained in this publicity. Manufacturers can aid the retailer by making enough products to supply the demand. We have more business than we can handle. The average water pan does not supply proper humidity.

From A. C. Buzzard, Holey, Michigan.

I send a list of my prospects to the manufacturers and they send out letters and pamphlets, referring the prospect to me. I then follow up with a personal call. The public is looking for anything cheap. Therefore, cheaper grades of warm air heaters are in demand. The pipeless warm air heater is rapidly taking the place of heating stoves.

From A. J. Bridges, Bedford, Iowa.

The sales for 1919 prove it to be the best year in our history for warm air heaters. The smaller sizes of warm air heaters are generally being substituted for stoves. The pipeless warm air heater will not injure the trade. I approve of state laws governing installation.

From an Installer in Montana.

We get names of prospective purchasers from contractors and lumber yards. Newspaper cuts furnished by manufacturers are occasionally utilized by us. One layer of asbestos paper is enough for protective purposes on warm air pipes. We cover casing with asbestos as well as pipes. Special humidifying devices are not necessary. Cold air intake from the inside of the house is the most practical method.

From W. W. Collar, New Brighton, Pennsylvania.

We use the Retail Credit Men's National Association's method of determining overhead expenses. It is practical to make a window display of warm air heaters. Sales for 1919 are about the same as those for 1918. Better quality of goods is in demand. Defective installation is decreasing.

From George Collins and Son, Farmer City, Illinois.

Window displays are the best means of advertising in a small town. Circulars sent to rural customers are a good method of gaining business in those sections of the territory. Inside intake of cold air is the best practice. We do not approve of State laws governing installation nor of State licensing of installers. Steam and hot water heating systems are not affecting our business.

From Cahill and Sarsaleil, Sioux City, Iowa.

Extensive advertising is the manner in which we get customers. Cheaper grades of heaters are in demand. The pipeless warm air heater is a detriment to the trade; we discourage it. We favor inside floor intake for cold air. However, means should be provided to take about one-third of the cold air from the outside.

From Cloos and Anderson, Havelock, Nebraska.

We oppose long term of credits; competition is too close. We use circulars provided by manufacturers. It is not practical to make a window display of warm air heaters. If properly attended to, the average water pan is sufficient to give ample moisture to the warm air.

From W. A. Covell and Son, Waterloo, Iowa.

A mailing list of customers is an advantage. We manage to make a personal call on all prospective purchasers. We have a small sample warm air heater; also use window posters and other advertising matter furnished by manufacturers. In our opinion the pipeless warm air heater is a good thing and will not injure the warm air heater trade as a whole. In most cases, retailers employ competent help.

From an Installer in Illinois.

Short credits make long friends. We make full use of circulars and other advertising helps furnished by manufacturers and wholesalers. We use our windows for display purposes. Sales were so great for 1919 that we could not employ sufficient help to meet the demands. The average water pan does not supply sufficient humidity. We find a demand for automatic humidifiers. Other systems of heating are not affecting our trade.

From the Chase Hardware Company, Medicine Lodge, Kansas.

We use advertising helps sent by manufacturers. Cheaper grades of warm air heaters are in demand. The pipeless warm air heater is not injuring the trade in this locality. In smaller towns dealers are not employing competent help to install their heaters. We favor a special humidifying device. Cold air intake on the inside is sufficient in most cases.

From the Carroll Heating and Plumbing Company, Sandwich, Illinois.

We believe that the pipeless warm air heaters are decidedly ruining the entire warm air heating industry. The exaggerated claims made by the manufacturers of various pipeless warm air heaters play upon the public ignorance of the true facts pertaining to warm air heating. The result is that after testing the true qualities of the pipeless warm air heaters, the consumers lose faith in all forms of warm air heaters, believing them to be in the nature of the pipeless. We have installed many special humidifying devices and they have proved satisfactory. Sales for 1919 are much better than in 1918. However, labor conditions offset the possible boom in this business.

From the P. C. De Val Hardware Company, Council Bluffs, Iowa.

Our list of prospective customers is constantly being renewed by old and satisfied purchasers. We keep window displays in our show space 12 months in the year with advantage. The most interesting display we ever had, however, was an enlarged plat of the city with a red pennant stuck in every location where we had made an installation. The recommendation of the medical fraternity for circulating warm air as the most healthful method of ventilation and heating for residences is having its effect.

From D. D. Devore, Oquawka, Illinois.

Carpenters keep us posted on prospective purchasers. Window displaying of warm air heating systems is profitable. Manufacturers can be of aid to dealers by quitting catalogue houses. Most retailers employ competent help to install their products. Other systems of heating are not affecting the warm air heating business as much as they used to.

From Dunshee Brothers, Chariton, Iowa.

Because of the cost of doing business it is necessary that accounts be paid promptly to enable dealers to discount bills. We keep a warm air heater on display all the year around, but do not do much advertising in the local papers. By claiming too much for the pipeless warm air heater, manufacturers are injuring the warm air heater business. If kept properly filled, the average water pan will provide sufficient humidity.

From D. R. Edwards, Le Mars, Iowa.

Manufacturers can aid the retailers by making the casing rings larger so there will be more air space between the casing and the edge of the heater and by increasing the capacity of the water pans. I have been in the business since 1865 and have found all jobs can not be installed in accordance with any general rule, but must conform to the kind of building. I prefer large pipes and registers and short runs to the registers.

From Michael Endres, New Philadelphia, Ohio.

By letting the job advertise, the dealer can increase his sales. By all means display warm air heater systems in the best available show space. Sales are best ever. The pipeless warm air heater has not hurt our business. Defective installation is about on the same average as previous years.

From Chas. A. Fitch, Millersburg, Ohio.

We find that there is always something wrong until the warm air heater is paid for. The utility of the pipeless warm air heater is surely being overestimated and in that way it is injuring the business as a whole. We have found that one layer of asbestos has proved satisfactory. There is not much of a demand for automatic humidifiers. For dwellings we use inside intake for cold air.

From an Installer in Ohio.

Window displays are a good means of advertising warm air heaters. We also use space in the local newspaper, changing the subject matter of the advertisement at least once a month. To cover warm air pipes we use air cell corrugated asbestos paper first and then cover it with Number 12; this makes the best job.

From an Installer in Nebraska.

I keep and use a mailing list of prospective buyers. As a source of getting a line on new customers we keep on good terms with carpenters, and perform satisfactory work for our regular customers. I used to give long term of credits, but now I have my customers sign a contract or a note. Display of a warm air heating system in the window has proved helpful. I also advertise in the local paper. There is enough cold air around the floor inside of a house to insure sufficient fresh air.

From Otto Geussenhainer, Sheboygan, Wisconsin.

All unproductive labor and all other costs of doing business are charged to overhead expense. We make very little use of manufacturers' advertising helps. The pipeless warm air heater, if handled only by experienced warm air heater men, will not injure the trade. Generally, retailers employ competent help to install their products. We favor inside intake; however, one intake is not as good as an intake in every room.

From G. Goebel, Bowling Green, Ohio.

If there is plenty of space in the window to make proper display of goods, it would be of benefit. The pipeless warm air heater is injuring the warm air heater industry. I have had some individual experiences along this line. The automatic humidifying device is the best for moisture.

From Edward Hesselschwerdt, Philo, Illinois.

In rural districts the better grades of heaters are

in demand. As a rule, hardware men do not employ competent help; regular tinshops do. In the basement I use one layer of asbestos paper over the warm air heater pipes, but in the wall I never use anything but double wall stack. In a large warm air heater with good air circulation the average water pan is sufficient; in the smaller ones if they are kept too hot it bakes the air and the humidity can not be kept up to the average.

From an Installer in Illinois.

We use our telephone directory as a source of prospects. We favor window displays. As for newspaper advertising, we are up against it; we have no local newspaper. Manufacturers can aid dealers by more thorough advertising and by setting a uniform price on all first class grades of warm air heaters. We believe that the water pan in most heaters is sufficient. Most retailers employ competent help to install their products.

From Frederick Y. Jenson, Ephorium, Utah.

By practical demonstration I manage to get a line of new customers. I do not give credit. Sales for 1919 are 200 per cent above those for the previous year. I favor state laws governing installation of warm air heaters. Other systems of heating are not affecting the warm air heater industry.

From W. A. Hoberstroh, Omaha, Nebraska.

I consider window displaying of warm air heaters a good thing. Advertising in the local newspapers is an excellent way to boost your business. We have never installed a pipeless warm air heater. The average water pan is sufficient but it should be cleaned and filled daily.

From an Installer in Indiana.

I think it would be a very good idea, in this locality, if the warm air heater men could get together in regard to prices. Window displaying of heaters is advantageous if the window is large enough. Sales are better for 1919 than the previous year. The pipeless warm air heater will injure the business as a whole. Some retailers employ competent help; others don't. I find it hard to get reliable installers.

From Charles Hahn, Chicago, Illinois.

A good job that makes the owner brag how little coal he burns will bring new customers. Better grades of heaters are in demand. The pipeless warm air heater is injuring the business. Air cell covering is best. I favor interior intake; however, it should be made sufficiently large enough. Go to any house where outside intake was provided and you will find it nailed up. State laws governing installation would be of no benefit.

From Frank R. Jarrell, Hoopston, Illinois.

Manufacturers can help by advertising their product, at the same time by trying to place their goods with dealers who are practical, and who will push the heating business on a legitimate basis. Smaller warm air heaters are not so much in demand as most people want at least a 24 inch fire bowl warm air heater. I always oppose the use of a pipeless warm air heater. The average water pan is not sufficient to supply adequate humidity. One layer of asbestos paper seems sufficient for warm air pipes, if not too light. I come

to the conclusion from my experience that, if the warm air heater business were entirely in the hands of practical men and experienced installers were employed we could look for better results, more satisfied customers, and more sales.

From L. U. Hoover, Milroy, Pennsylvania.

Heaters should be properly featured in windows together with heating accessories and coupled up with advertising circulars and other aiding features that the dealer is in a position to employ. The pipeless warm air heater game is being overdone and there will be a reaction. Outside air should always be a part of every installation, but at the same time, the inside intake can be combined with the outside.

From Joseph Harman, Duluth, Minnesota.

I get a line on new customers from architects, builders' exchange, etc. If a warm air heater has some point of merit it is a very good idea to display it and call the attention of passers-by to it. The pipeless warm air heater has already hurt the warm air heating industry. Hot water and steam heating men favor the pipeless warm air heater. It aids their business.

From Joseph Lauth, Pontiac, Illinois.

I have all the customers I can serve with the help I am able to get.

Too much time is lost keeping books and other red tape when long term of credits are allowed. I consider the moving picture houses the best mediums for advertising.

From James H. Lane, Grand Junction, Colorado.

We keep a "present" and also a "future" list of prospective purchasers. We are opposed to long terms of credit. It costs too much to handle them, and some of them are very hard to collect. We do not recommend the pipeless warm air heater. Defective installation, it seems, is decreasing in this territory. The pipeless warm air heater is no more hazardous for fire than the pipe installation, if it is properly installed. If the asbestos paper is sufficiently heavy, we consider one layer better than two. A properly installed warm air heating plant in a residence is the most economical, healthful, and easily operating heating plant on the market.

From J. W. Leppla, Seaside, Oregon.

Retailers on the whole employ competent help. If properly applied, one layer of asbestos paper is enough for protection for warm air pipes. I hardly think the average water pan is sufficient for proper humidity. I use both the inside and outside method of cold air intake.

From George Lingelbach, Deshler, Nebraska.

We get a line on new customers through advertising in local newspapers. We make good use of manufacturers' advertising helps. Manufacturers can aid the retailers by employing good heating engineers. Defective installation is decreasing. I approve State laws governing installation of warm air heaters.

From an Installer in Iowa.

The pipeless warm air heater is injuring the warm air heater industry. We employ competent help to install our heaters. One layer of asbestos on pipes is sufficient. The average water pan is not adequate for

moisture. We favor interior cold air intake. State laws governing installation would be all right.

From the Levin Manufacturing Company, Chicago, Illinois.

I rely on recommendations for my work as a source of new customers. Window demonstration of warm air heaters is beneficial. The manufacturer can aid the retailer by advertising him in his district. Small sized heaters are substituting stoves to a great extent. We do not think the pipeless warm air heater is injuring the industry as a whole. Retailers employ competent help.

From H. R. Lander, Malvern, Iowa.

We sell two carloads of heaters a year and never put a sample on the floor. However, we do use a great deal of newspaper advertising and print a booklet containing the endorsements of satisfied users. The pipeless warm air heater has already done some harm in our territory. Manufacturers can aid retailers by sending personal letters to their prospective customers.

From an Installer in Wisconsin.

We distribute circulars supplied us by manufacturers and use window display material. We do not think the pipeless warm air heater is injuring the warm air heater business. An improperly installed pipeless warm air heater might cause trouble with regard to fire. The average water pan is adequate if filled every day. Inside intake is sufficient to meet all practical purposes.

From Edward Knabe, Rock Falls, Illinois.

I do not keep a mailing list of prospective customers. If State laws were enacted governing installation of warm air heaters requiring all installers to be licensed I would favor it. It would increase the warm air heating business, in my estimate, 100 per cent. I have been in the business for 22 years, and I am satisfied from practical experience that a properly installed warm air heating plant is far superior to hot water and steam heating at the same price.

From H. T. Maring, Gettysburg, Pennsylvania.

I do very little advertising; I have no show window, my place is in an alley. Former sales bring us enough business. With regard to fire hazard of the pipeless warm air heater would state, we have always been careful to install them in a safe condition. The automatic humidifier is a good idea. Installers should not be licensed by the State.

From the Merrill Sheet Metal Works, Merrill, Wisconsin.

We solicit new customers personally. We generally display a warm air heater in our window together with the manufacturers' advertising aids. Also, we connect it with our newspaper advertisements. We handle only the better grades of heaters. The pipeless warm air heater is not injuring the trade. It leads to regular warm air heater business. In our vicinity where the buildings are not built close together inside intake of cold air is the best method.

From an Installer in Nebraska.

With regard to long term credits, we find that warm air heaters paid for function better than those unpaid. I advise winter and summer advertising in newspapers and a personal visit to those answering the advertisements.

From S. E. McDowell, Pewaukee, Wisconsin.

Manufacturers can aid retailers by seeing to it that their goods are properly installed and not overrated. The pipeless warm air heater is not injuring the warm air heater industry to any great extent. Defective installation is decreasing. I approve State laws governing installation of warm air heaters.

From M. S. McNeere, New Brighton, Pennsylvania.

I think all heating men should keep a mailing list of prospective customers. Window display of warm air heaters is a good plan to draw attention to the product. I do not think installation on the whole is improving. If put in the proper place, the average water pan will do. I favor an interior cold air intake and in my experience I have changed many outside intakes to interior intakes.

From J. E. Nyr, Manchester, Iowa.

A heating plant is seldom satisfactory if long term of credits are allowed on it. A good window display is effective in any line. As to whether the pipeless warm air heater injures the trade or not—that depends on the merchant. I think the pipeless warm air heater very safe. A humidifying apparatus would be an advantage.

From the Meulenberg Sheet Metal Works, Kalamazoo, Michigan.

We think defective installation is increasing because manufacturers will sell to anyone, regardless whether he knows how to install a warm air heater or not. We certainly do favor State laws governing installation if they are made strict enough. The laws should require a man to have at least three years of experience along this line. From our observation during the last two years we can believe that steam and hot water have not injured our business.

From an Installer in Ohio.

We get a line on new customers by advertising and canvassing. Better grade of goods are in demand. Manufacturers can help retailers by conducting the right kind of advertising. Retailers employ competent help if they can get it. If of the right thickness, one layer of asbestos is sufficient to protect warm air pipes. The average water pan is adequate.

From John A. Pontius, Geneva, New York.

I use the electros sent me by manufacturers in the daily newspapers; also bill board signs. Manufacturers can aid retailers by eliminating impractical men as agents so that proper installation may be insured. I think the pipeless warm air heater is injuring the warm air heater industry to some extent. I never saw anything hazardous about a pipeless warm air heater.

From Harry A. Probst, Queen, Wisconsin.

I keep in touch with all the contractors and retail lumber dealers, and in that way I am able to get a line on new customers. I believe window displaying to be a good thing. It should be connected with the local advertisement. The pipeless warm air heater does not injure the trade in my territory. One layer of asbestos on warm air pipes is not enough.

From C. H. Robinson, Springfield, Illinois.

We are very busy. Price is always the factor in determining the products bought—especially now. The pipeless warm air heater is no doubt all right and

does not injure the trade. Inside intake is the proper method. I think state laws governing installation are unnecessary.

From J. Oscar Smith, Moberly, Missouri.

I believe there is a great future for the one pipe heater if correctly located and proper grills provided to give perfect circulation. Education on this point and exchange of ideas through trade journals will result in much benefit both to the customer and the contractor. Greater success in the trade could be had by the cooperation of manufacturers with retailers. They should be more careful in placing their agencies with firms who are not regularly engaged in the heating business. I believe most warm air heating contractors are too free in giving their customer his way in locating registers, cold air face locations, and even the locating of the heater. If installers would insist on the best and most practical positions for these things and refuse the job otherwise, we would avoid some complaints. I find it possible to sell one pipe heaters to customers who would not buy a pipe job because of the extra basement room, cooler cellar and quicker heat, with less fuel, etc.

From B. F. Stow, Wyarret, Illinois.

My opinion is that the casings of warm air heaters should have a larger diameter. Also, pipes should be about 25 per cent larger than is commonly the custom. If the warm air heater and the pipes are of ample capacity one layer of asbestos is sufficient. Automatic humidifiers are not necessary. I think the combination of inside and outside intake good.

From the Sanders Furnace Company, Fort Dodge, Iowa.

We use the advertising matter sent to us by manufacturers to the greatest possible benefit. The last six months of this year were the best in our history. Great care should be exercised in avoiding too flourishing promises for the possibilities of the pipeless warm air heater.

From H. H. Spohr, Marshalltown, Iowa.

The prices on steam, hot water, and vapor heating jobs at present are selling warm air heaters in this territory every day. I approve State licensing of warm air heater installers; likewise State laws governing installation. I have found that window display pays.

From G. L. Yapple and Son, Burlington Junction, Missouri.

We keep a mailing list of prospective customers. Long term of credits is not necessary. We display warm air heaters in our windows and connect them with our newspaper advertisements. This is the best year we have ever had. Better grades of goods are in demand. Manufacturers can aid retailers by mailing follow-up letters to prospective buyers. The pipeless warm air heater is not injuring the warm air heater trade now. At first some people were misled but the public is generally informed at this time. Retailers employ competent help. We prefer a special humidifying device. Other systems of heating are not affecting the warm air heater business.

To will to conceive new ideas about the conduct of your business or the arrangement of your stock is the foundation on which all constructive ideas must be reared.

HEATING AND VENTILATING

LEASE A SPACIOUS WAREHOUSE AND INCREASE THEIR FACILITIES FOR HANDLING HEATING SUPPLIES.

Increased business has rendered the quarters of The Central Heating Supply Company, at 129-131 West Lake Street, Chicago, Illinois, inadequate to meet the demands for warm air heaters and heating supplies handled by that company. They have, therefore, recently leased a large warehouse bordering the "Central Manufacturing District" of Chicago, a conveniently located section of the city with regard to railroad transportation facilities. In view of this advantageous addition, the Central Heating Supply Company announces it will be in a position more efficiently to meet the needs of its customers.

The Central Heating Supply Company is the exclusive Chicago distributor of Premier Warm Air Heaters, Lamneck Simplified Warm Air Heater Fittings, United States Register Company's full line of floor and baseboard registers, and Waterloo Register Company's Everlasting Cast Iron Smoke Pipe. All the necessary accessories for installing warm air heaters are handled by this company.

An interesting catalogue and other literature pertaining to warm air heaters and supplies will be sent to dealers who write the Central Heating Supply Company, 131 West Lake Street, Chicago, Illinois.

SAYS HEATING AND VENTILATING GO HAND IN HAND.

Milton J. Rosenau, Professor of Preventive Medicine and Hygiene in the Harvard University and formerly Director of the Hygiene Laboratory of the United States Public Health Service, in his book, *Preventive Medicine and Hygiene*, devotes some interesting pages to the subject of heating and ventilating. His book deals largely with the prevention of the many ills to which the human body is subject. In his chapter on The Benefits of Fresh Air he writes: "Fresh air is nature's tonic. It stimulates digestion, promotes assimilation, improves metabolism, strengthens the nervous system and increases our resistance against some diseases." Professor Rosenau goes to great length depicting the ravaging effect of vitiated air on the human body. In his discourse on ventilation, the professor comes to the conclusion that heating and ventilation go hand in hand. He briefly comments on the various systems of heating. More space is devoted in his book to the warm air heating system than to any other method of heating. Regarding warm air heaters he says: "A hot air furnace constantly pumps fresh air into the house and is, therefore, a very efficient system of ventilation." He lays much stress on the necessity of humidity in connection

with warm air heaters. It is his belief that the average water pan is not sufficient to supply adequate moisture. The average water pan, he claims, is ridiculously small.

"KEEP A-GOIN'!" IS SLOGAN ADOPTED BY MANUFACTURER OF WARM AIR HEATERS.

Some dynamic man has coined an expressive word—"sticktoitiveness." It is no idle dream. Not one industry or business establishment can be pointed out that has prospered otherwise than by dint of hard work and constant application. It is the law of progress never to let up. Many able men and establishments have gone down in the face of the exacting demands of life. "Keep A-Goin'!" is a slogan that carried Columbus across the Atlantic ocean when the majority of learned men of that time declared it to be certain death. The same spirit won the war. And the same incentive will place American business and with it the superstructure of society on a prosperous basis. When the Hero Furnace Company of Chicago, Illinois, took as its slogan "Keep A-Goin'!" it did so with the full realization of the superhuman effort that was required to carry out its spirit to the letter. In the following stanzas by Frank L. Stanton, which is being sent out to the trade by the Hero Furnace Company announcing its newly adopted slogan, is strikingly set forth the requirements of "Keep A-Goin'!"

If you strike a thorn or rose
Keep a-goin'!

If it hails or if it snows
Keep a-goin'!

'Tain't no use to sit and whine
When the fish ain't on the line,
Bait your hook an' keep on tryin'!
Keep a-goin'!

When the weather kills your crop,
Keep a-goin'!

When you tumble from the top,
Keep a-goin'!

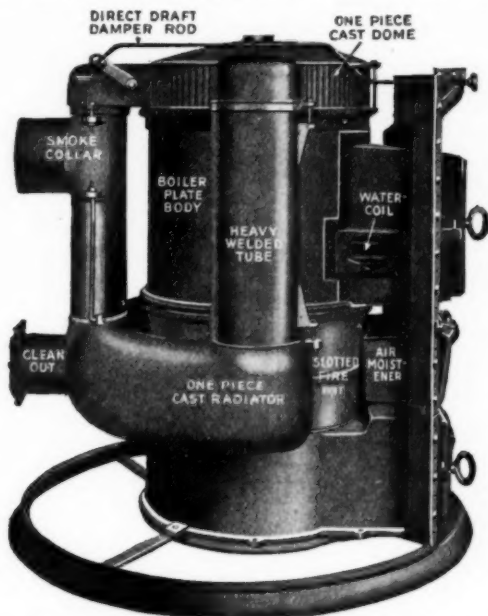
S'pose you're out of every dime?
Gettin' broke ain't any crime!
Tell the world you're feelin' prime—
Keep a-goin'!

When it looks like all is up,
Keep a-goin'!
Drain the sweetness from the cup,
Keep a-goin'!
See the wild birds on the wing!
Hear the bells that sweetly ring!
When you feel like singing—sing!
Keep a-goin'!

Latest Types of Warm Air Heaters and Accessories Show Material Improvement.

HAS INTERCHANGEABLE GRATES.

The Monroe Foundry and Furnace Company of Monroe, Michigan, makes the Floral City King Warm Air Heater shown in the illustration herewith. It burns hard or soft coal, coke or wood and is made both portable and brick-set. The fire doors are large and a shield or apron is hung just inside the door to keep the smoke from puffing out when the door is opened and when wood or soft coal is used. The Floral City King Heater has a simple device by which the grates are locked securely in place and any bar can be removed without disturbing the others. There are no bolts and no rights or lefts, as the two long



Side View of Floral City King Warm Air Heater, Made by the Monroe Foundry and Furnace Company, Monroe, Michigan.

or two short bars which make the set are interchangeable.

The fire pot in this heater can be furnished in either the single piece corrugated pot or a smooth two piece pot of heavy pattern. They come in 21 inches, 24 inches or 27 inches. They are made as straight as possible to prevent the ashes from clinging to the sides. It also prevents the clinkers from forming a bridge above the grates. By addressing the Monroe Foundry and Furnace Company, Monroe, Michigan, dealers may secure further particulars and literature.

UTILIZES HARD OR SOFT COAL.

The Apex Warm Air Heater, illustrated herewith, manufactured by the Youngstown Furnace Company, Youngstown, Ohio, is especially built to burn hard or soft coal successfully, declare the makers. Its construction is ample to withstand the hottest fire, they say. The fire pot is of the slotted type, which allows of expansion. This protects it from

intense heat, and also increases the draft. The ash pit in the Apex Warm Air Heater is very large, the opening in front permitting unobstructed access to the ashes. It is the statement of the producers that all in all this warm air heater is constructed to meet



Apex Warm Air Heater, Made by the Youngstown Furnace Company, Youngstown, Ohio.

the demand for a powerful heater. The material and workmanship are admitted into its makeup only after careful selection. That its long list of satisfied users is an assurance of future sales, is the argument of the manufacturers. Dealers desiring more exhaustive details touching upon the Apex Warm Air Heater can obtain information from the Youngstown Furnace Company, 630 Marshall Street, Youngstown, Ohio. Western Distributing Agent, Carr Supply Company, 412-414 North Dearborn Street, Chicago, Illinois.

IS OF SIMPLE AND DURABLE MAKE.

Simplicity begets approval of the general public if coupled with the best possible utility. It is the claim



Victor Warm Air Heater, Made by the Hall-Neal Furnace Company, Indianapolis, Indiana.

of the Hall-Neal Furnace Company, Indianapolis, Indiana, manufacturers of the Victor Warm Air Heater, illustrated herewith, that its simplicity and economical utility have gained for it thousands of satisfied and enthusiastic users in the past eighteen years and the list is growing by leaps and bounds.

One of the economical features of this heater, declare

the makers, is that any fuel can be burned and the gases efficiently utilized. The arrangement of the fire pot and the various other mechanisms of this warm air heater, as can be noted in the illustration, are of the kind that insure proper combustion. Built of steel, the Victor Warm Air Heater will not crack when intensely heated and will endure an uncommonly long time, aver the producers. Because of the vertical build of the heating surface, no soot can collect on the sides. An adequate draft is insured. According to the manufacturers, every seam is tightly riveted and is dust and gas-proof. Victor warm air heaters are equipped with a dust flue which carries away ash dust when shaking down the fire. Lined with fire brick, the fire pot is highly durable and will withstand terrific heat, say the producers. More complete details and terms of agency can be obtained from the Hall-Neal Furnace Company, 137-39 West Washington Street, Indianapolis, Indiana.

INCREASES RADIATION CAPACITY.

Heat is of no value in warm air heating unless it can be efficiently radiated so that it may heat volumes of air. The capacity for radiation of various warm air heaters differs. Some are greater than others. In a large measure, the space that disseminates the warmth determines the worth of the heating system. The Home Comfort Warm Air Heater, illustrated herewith, made by the Wrought



Home Comfort Warm Air Heater, Made by the Wrought Iron Range Company, St. Louis, Missouri.

Iron Range Company, St. Louis, Missouri, has increased means of radiation, aver the makers. Heat is sent forth, not only from the dome and head piece, but from the down-draft arrangement of the radiators which takes the smoke from the top of the dome and conducts it downward to the level of the ash pit, is the statement of the producers. In the ash pit it enters a chamber, then passes through a single pipe and is carried up again to the flue connected with the chimney. This all takes place within the warm air heater. According to the manufacturers, by the time the smoke emerges from the radiator, practically all the accompanying heat has been extracted. The economy of such an arrangement is plainly evident. The radiators are built on curved lines. Other details of interest are to be found in the construction of the Home Comfort Warm Air Heater. Dealers desiring further information concerning this line will be promptly answered if they write to the Wrought Iron Range Company, St. Louis, Missouri.

PATENTED AUTOMATIC HUMIDIFIER IS A SPECIAL FEATURE.

The Round Oak Moistair Heating System, which is shown herewith, has a patented automatic humidifier which makes possible the circulation of pure warm



Round Oak Moistair Heating System, Made by The Beckwith Company, Dowagiac, Michigan.

air that is claimed to be free from dust, gas, and smoke. This is manufactured by The Beckwith Company, Dowagiac, Michigan. It burns all kinds of fuel. The Round Oak Moistair Heating System has a long, indirect fire travel which radiates the heat directly into the casing and robs the heat from the chimney. Wherever possible in this heater, rivets are used instead of bolts. All hinge pieces are drilled. The entire system is controlled by a single register which is conveniently located. The big seamless ash pit is fitted with a sprinkler which prevents dust. The Beckwith Company has a comprehensive line of dealer helps. They have local newspaper advertisements, striking window displays, illustrated booklets, hangers, posters, etc. They have good sales propositions and dealers should write to The Beckwith Company, 258 Front Street, Dowagiac, Michigan.

GRATES ARE A SPECIAL FEATURE.

The Moncrief Top Return Flue Warm Air All Cast Iron Heater is shown in the accompanying illustration. It is manufactured by The Henry-Miller Foundry Company of Cleveland, Ohio. This heater is durably and simply constructed with a careful distribution of iron, placing the heaviest parts where there is the greatest strain.

The radiator consists of a large combustion chamber, crowned with an all cast top return flue which compels the products of combustion to travel around both sides of the top before entering the smoke exit. This is a scientific construction as it is said to cause all the products of combustion to be retained within the casing walls a sufficient length of time to extract every available unit of heat. The clean-out collar and smoke collar are extra long which provides for their extension beyond the casing. The manufacturers say that this obviates all possibility of gas or smoke escaping and rising through the conductor pipes. The grates in the Moncrief Heater are a special feature. They are easy to operate, the use of a poker being unnecessary. The ash pit is large and roomy and sets over the concave base.

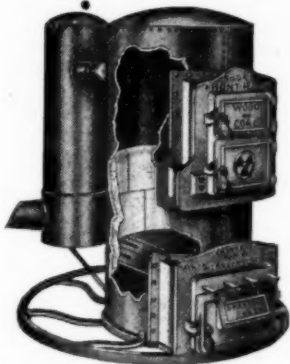


Moncrief Warm Air Heater, Made by The Henry-Miller Foundry Company, Cleveland, Ohio.

making it convenient for the removal of ashes. It would be to the advantage of dealers to communicate with The Henry-Miller Foundry Company of Cleveland, Ohio.

IS RIVETED LIKE A BOILER.

The Haynes-Langenberg Manufacturing Company of St. Louis, Missouri, manufacturers of the Front Rank Warm Air Heater, shown in the accompanying illustration, lay particular stress on the predominating feature of their heater—its gas tight and dust proof construction. The drum or fire chamber is made of a solid sheet of heavy armor plate with a single seam, closely riveted like a boiler. Heavy cast flanges are placed around the openings where the

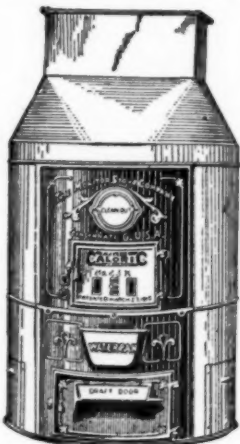


Front Rank Warm Air Heater, Made by the Haynes-Langenberg Manufacturing Company, St. Louis, Missouri.

smoke passes from the drum into the radiators to protect the steel. The drum and radiators are self-cleaning and it is said that not even the dirtiest soft coal will choke them up. The only part that needs cleaning is the horizontal dust box. The fire pot is lined with fire clay tiling. This heater has no direct draft to let the heat escape straight up the chimney. The smoke has a very long fire travel before leaving the heater and all of this travel is inside the casing. This insures economy in fuel. The Front Rank heater is simply constructed of high grade steel and is very easily operated. Dealers and others interested will find it to their advantage to communicate with the Haynes-Langenberg Manufacturing Company, 4058 Forest Park Boulevard, St. Louis, Missouri.

GUARANTEES FIRE POT TO ENDURE.

Cincinnati, Ohio, makes the Caloric Pipeless Warm Air Heater, illustrated herewith. The double



Caloric Pipeless Warm Air Heater, Made by the Monitor Stove Company, Cincinnati, Ohio.

ribbed fire pot installed in this warm air heater is constructed of highly durable material and is guaranteed for five years, declares the maker. A triple inner casting provides perfect insulation and insures an uninterrupted flow of warm air due to proper connection. The combustion chamber is an economical feature of the Caloric Pipeless Warm Air Heater. Coal gases are consumed in it and every molecule of heat obtainable is derived by the perfect combustion, over the makers. A two-gallon water pan provides

humidity to the air, thus enhancing its heat-containing quality and making it more healthful to breathe. In

the interest of dealers the Monitor Stove Company conducts nation-wide advertising campaign, familiarizing the public with the advantageous properties of its product. Retailers who have profited by advertising done by manufacturers can realize the weight of such publicity in enhancing their sales of the product advertised. A communication to the Monitor Stove Company, 500 Gest Street, Cincinnati, Ohio, will be promptly answered.

PRODUCES A UNIFORM DRAFT.

Pipeless warm air heaters are becoming more and more popular, and, in many instances, they have made a remarkable success. In the accompanying illustration is shown the Wise Pipeless Heater, made by The



Wise Furnace Company, Akron, Ohio. It has a heavy cast iron fire pot, one piece, with a series of cells and slots cast in the walls of the pot extending from the bottom to the top, into which the air is admitted and heated before entering into and above the fuel. This supplies the fire with heated air and enables it to consume fully ninety per cent of the gas and smoke, state the manufacturers.

The Company claims economy for this fire pot

for the reason that all particles of fuel in the pot are subject to a uniform draft. Soft coal of the poorest grades, as well as hard coal, lignite, and wood are equally and successfully burned. By admitting heated air through the slots and mixing with the gases and smoke, the makers state that they secure a perfect combustion and the complete consuming of the gases, extracting the greatest amount of heat from a given amount of fuel. This fire pot is also very durable and it is said it will not crack from unequal expansion and contraction. A constant circulation of air in the walls of the pot and air all around the pot enables a uniform heat to be obtained at all times. The Wise Furnace Company of Akron, Ohio, publishes a booklet with full information about their pipeless and regular warm air heaters which will be sent to those requesting it.

KEEPS THE GAS OF FIRE BOX FROM GETTING INTO AIR CHAMBERS.

Making the body of the Lennox Torrid Zone Warm Air Heater into one solid piece enables the placing of

the fire box linings on the inside, so that these extremely hot linings may expand and contract without



Lennox Torrid Zone Warm Air Heater, Made by The Lennox Furnace Company, Marshalltown, Iowa.

having any connection at all with the air passages surrounding the heater. The manufacturers, The Lennox Furnace Company of Marshalltown, Iowa, state that by this construction there is no possibility of the gases from the fire box passing into the air chamber. The Lennox Torrid

Zone heater is made of mild open hearth steel which is said to contain the least possible amount of impurities and, it is claimed, is very little affected by sulphur and other chemicals in coals. It has all its working parts, including its sectional fire box, enclosed in a steel combustion chamber which is riveted into practically one piece. As the fire pot in this heater is in sections, it is easy to repair, as it can readily be removed through the double doors without disturbing the heater. The feed doors are made double, the lower part shuts against the upper and laps. It is hinged separately, and may be opened without opening the upper door. When both doors are open, the opening is 13 x 16 inches. The Lennox Furnace Company of Marshalltown, Iowa, will send catalogue and circulars upon request.

PYRAMID GRATE INCREASES HEAT.

The Pyramid Grate installed in the Pyramid Warm Air Heater, made by the Forest City Foundry and Manufacturing Company, Cleveland, Ohio,



Pyramid Warm Air Heater, Made by the Forest City Foundry and Manufacturing Company, Cleveland, Ohio.

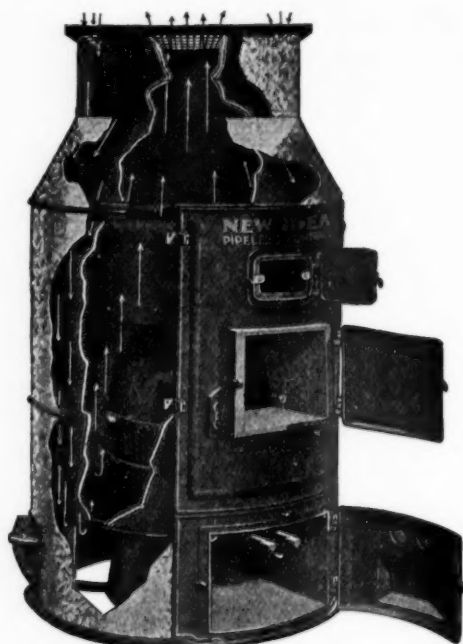
is a feature worth the attention of all warm air heater dealers. The grate can be seen in the illustration of the Pyramid Warm Air Heater herewith. Its position causes the

fuel to be rolled to the outside. The red hot coals are forced to the side of the radiating surface of the heater. According to the statement of the manufacturers, there is thereby produced a more efficient radiation and a better utilization of the amount of fuel used as compared with other warm air heaters. The joints are all perfect fitting, deep cup. All materials are of a tested grade. The makers declare that the

Pyramid Warm Air Heater is constructed to withstand its intense heating power. Further details and descriptive literature can be obtained by communicating with the Forest City Foundry and Manufacturing Company, Cleveland, Ohio.

IS CUP JOINTED THROUGHOUT.

The Utica Heater Company of Utica, New York, and Chicago, Illinois, makes the New-Idea Pipeless Warm Air Heater which is shown in the illustration herewith. This is cup jointed throughout—allowing for expansion and contraction. The fire pot is two-piece and very durable. The ash pit is deep and roomy and made in one piece with a cast iron bottom to receive the ashes. The triangular anti-clinker shaking grates are simple and the direct connected cleanout provides ready access for cleaning. The water pan is large thus furnishing abundant moisture for the air.



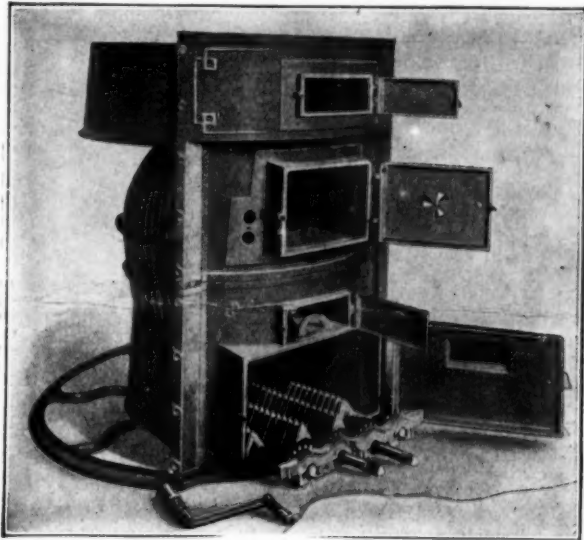
New-Idea Pipeless Heater, Made by the Utica Heater Company, Utica, New York, and Chicago, Illinois.

The radiator is either heavy steel plate or one piece cast. The cast radiator is made without bolts, joints or rivets. It is said to be absolutely gas tight and dust proof. The outside casings are of heavy galvanized iron. The inside casings are of galvanized iron, lined with asbestos and tin. There is no doubt that this New-Idea Pipeless Heater is vastly superior to the ordinary heating stove. It reaches all the corners and there is a continuous circulation of constantly changing air throughout the house. By addressing the Utica Heater Company, Utica, New York, or Box 100, 218 West Kinzie Street, Chicago, Illinois, dealers may secure full particulars and literature.

BUILD GIVES IT GREAT STRENGTH.

Sky scrapers are built on straight lines. The straight tree is the strong tree. Wherefore the "Built Rite" Warm Air Heater, illustrated herewith, manufactured by The Hammond Heating Company, Cincinnati, Ohio, is built on straight lines, declares the

makers. The front is all cast. A large combustion chamber provides ample room for the burning of coal gases. Also, the unusually big radiator utilizes the heat generated. The clean-out is extra large. It is said all the doors are tight fitting thus preventing the escape of gas or dust. The fire pot is in two pieces. To add to its strength, it is corrugated. An extra



"Bilt Rite" Warm Air Heater, Made by The Hammond Heating Company, Cincinnati, Ohio.

heavy, triangular grate installed in the "Bilt Rite" Warm Air Heater increases its service. These grates, declare the manufacturers, are easily operated. They can be removed and replaced with facility. All dampers are ground to fit. With them, it is claimed, the fire can be perfectly controlled. At all times The Hammond Heating Company, Cincinnati, Ohio, is ready to answer questions concerning its product. Dealers and installers should write to them.

FIRE POT IS MADE WITH HOT BLAST SLOTS IN LOWER SECTION.

The Rudy Furnace Company of Dowagiac, Michigan, makes the Rudy Diving Flue Warm Air Heater which is shown in the illustration herewith. The main



THE RUDY DIVING FLUE FURNACE

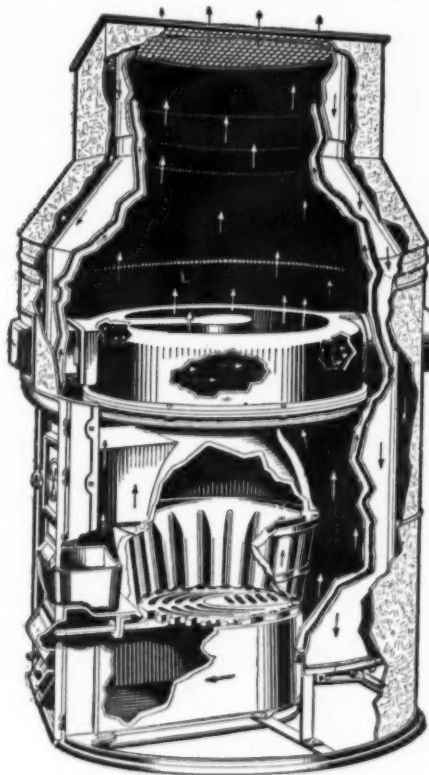
Rudy Diving Flue Warm Air Heater, Made by the Rudy Furnace Company, Dowagiac, Michigan.

top is extra heavy, made of a single piece corrugated, and it causes the gases to rotate and mix thoroughly. The combustion chamber is corrugated which is said to give extra radiating service, and it forces an intimate mixture of burning gases which compels complete combustion. There is a two piece fire pot, heavy, with hot blast slots in the lower section so there is nothing to burn out. The ash pit is deep and roomy and made to hold water. The damper is upright instead of horizontal and the Company states it will not stick or warp.

The joints are double cupped and locked which makes it gas and dust tight. The bottom ring is strong and durable and forms a rigid support for the casing. The water pot is large, holding five gallons. It is so located as to cause adequate evaporation. The diving flue radiator is cast in two pieces which assures castings of uniform thickness and a smooth inside. The Company defines its diving flue system as "A long fire travel within the heater and an enormous circulation of air around the flues." Catalogue and circulars may be secured by writing to the Rudy Furnace Company, Dowagiac, Michigan.

MEETS PURCHASERS' DEMANDS.

In the last analysis, the concrete problem of meeting the needs of the prospective purchaser of a warm



Globe Pipeless Warm Air Heater, Made by The Globe Stove and Range Company, Kokomo, Indiana.

air heater is simple. He wants the most he can get for his money. He wants the greatest amount of healthful, heated air for the amount he expends for fuel. Of course, the depreciation of the heater and other such sundry details must be taken into consideration. The Globe Pipeless Warm Air Heater, illustrated herewith, is a product that meets the purchasers' demand for economy

and utility, declare the manufacturers, The Globe Stove and Range Company, Kokomo, Indiana. In their literature they completely describe every detail of construction of the Globe Pipeless warm air heater. According to the manufacturers, a double-walled inner casing represents a perfect air insulator, allowing the cold air to drop downward undisturbed. Without this insulator, declare the makers, the cold air would be heated prematurely, and in accordance with the law of convection, would rise, thus interrupting the desired circulation of air. The Globe anti-clinker grate is said to be designed to guard against the dropping through of small coals. A combustion chamber of ample proportions, it is claimed, burns the gases and soot produced by the coal. The radiator is scientifically constructed to extract the greatest amount of heat possible and still permit a sufficiently strong draft properly to carry off the smoke. For catalogue and other details concerning agency for these heaters, write the Globe Stove and Range Company, Kokomo, Indiana.

EMBODIES QUALITY AND SERVICE.

Quality plus service, is the motto of the Standard Furnace and Supply Company, Omaha, Nebraska, manufacturers of the Nesbit Warm Air Heater, illustrated herewith. As an example of quality, the Nesbit Warm



Nesbit Warm Air Heater,
Made by the Standard
Furnace and Supply Com-
pany, Omaha, Nebraska.

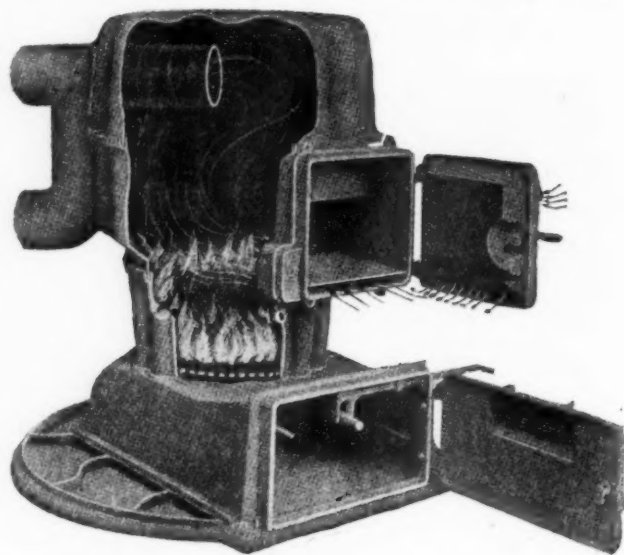
Air Heater has proved satisfactory to all users, declare the makers. The triangular grate bars used in these warm air heaters are unusually strong and make it easy to keep the fire free from ashes and clinkers. The bars are movable either to the right or left. The manufacturers state that the device for hanging the bars is unique, being simple and steadfast. Removal

of the bars can be done without the use of tools. Combustion is perfected by placing the feed section or body higher than is ordinarily the case. The feed door is large and roomy. Radiation space is also increased. This type of warm air heater can be successfully used with either bituminous or anthracite coal; however, it is especially adapted for bituminous coal. A large vapor pan under the feed door provides sufficient humidity to the warm air. Besides the Nesbit Warm Air Heater, the Standard Furnace and Supply Company, handle the Weir and Peerless. A portion of the advertising spent by retailers is paid for by this company when advertising the Weir, Peerless Gravity Dealer, or Nesbit Warm Air Heaters. Other warm air heaters, as well as various supplies necessary in the installation of heating systems, can be furnished by them. A letter to the Standard Furnace and Supply Company, 407-409-411-413 South 10th Street, Omaha, Nebraska, concerning the line of warm air heaters handled by them, or regarding supplies, will be promptly answered.

CONSTRUCTS RELIABLE PRODUCT.

The Farris Warm Air Heater, illustrated herewith, is manufactured by the Farris Furnace Company, Springfield, Illinois. Its construction is made with a view of rendering it gas-tight and dust-proof. That this has been accomplished has been proved by the long list of satisfied users, declares the manufacturers. Moreover, they state, it is designed to extract the maximum of heat from the amount of coal used. This is obtained in the Farris Warm Air Heater, claim the makers, first, because the slotted fire pot permits the most effective burning of the solid fuel; second, because the pre-heated draft over the fire burns the gases in the large combustion dome. The smoke nuisance, so thoroughly denounced today by the health departments of many large cities, is effectually lessened by means of the combustion in this warm air heater, aver the producers. An especial point of interest in the warm air heater under consideration is the diving flue pipe which can be seen at the left hand upper corner in the illustration. The flue pipe in the

dome chamber extends well to the center of the dome. A high efficiency of heat before it gets a chance to pass into the flue is obtained thereby. Heat which would otherwise pass up the chimney with the smoke is transmitted into the warm air chamber by the div-

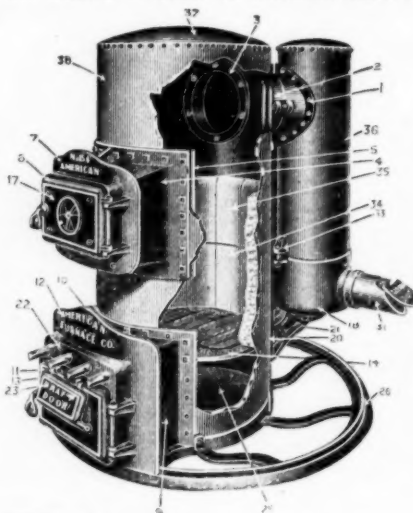


Farris Warm Air Heater, Made by the Farris Furnace Company, Springfield, Illinois.

ing flue pipe. Illustrated literature describing, in detail the various parts and constructions of the Farris Warm Air Heater which would be vitally interesting to dealers can be obtained upon inquiry to the Farris Furnace Company, Springfield, Illinois.

CONFORMS WITH SCIENTIFIC FACT.

Illustrated herewith is the American Boiler Plate Warm Air Heater, manufactured by the American Furnace Company, St. Louis, Missouri. This warm air heater is built on vertical lines in conformity with a



American Boiler Plate Warm Air Heater,
Made by the American Furnace Com-
pany, St. Louis, Missouri.

scientific fact. Air can be heated only by direct contact with hot surfaces. The sun heats the earth which in turn heats the air. The atmosphere a mile above the earth's surface is markedly colder than the air closer to the earth. At a height of three miles above the earth's surface the air is intense-

ly cold at all times. Heated air rises in straight currents and its ascent keeps in direct contact with the entire surface of the warm air heater when built on vertical lines, aver the manufacturers of the American Boiler Plate Warm Air Heater. The fire pot in this warm air heater is constructed of one piece of heavy steel, except the head. It is lined with the very best sectional fire-brick. The bricks are set in a circle and support one another in a manner that

prevents their falling out. A strong, triangular grate, hollow in the center, is installed in the warm air heater depicted herewith. On January 1, 1920, this company will have ready its new Thermo Pipeless Warm Air Heater. According to the manufacturers, the essence of its 30 years of experience in the warm air heating industry is embodied in the construction of the Thermo Pipeless Warm Air Heaters. The casing of these heaters is unusually large. The ashpit is big and roomy. Also, the American Furnace Company announces that on about the same date that its Thermo Pipeless Warm Air Heater will be ready for distribution, its new Afco Room Heater will be completed. Dealers are being materially aided in the way of advertising by the American Furnace Company. This company is issuing a set of piquant circulars that can be sent out by dealers to prospective purchasers. These cards contain interesting information in regard to warm air heating. There is a blank space in which the retailer can place his name. Complete details concerning agency for the American Furnace Company, 2725-27-29-31 Morgan Street, St. Louis, Missouri.

PROVIDES AGAINST FUEL SHORTAGE.

During fuel shortages the Scheible Warm Air Heater, depicted herewith, manufactured by the Scheible-



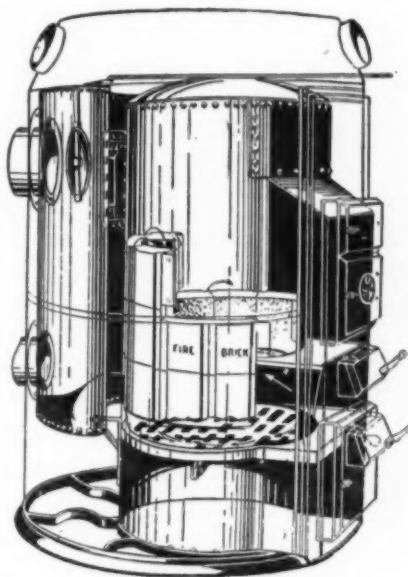
Scheible Warm Air Heater, Made by the Scheible-Moncrief Heater Company, Cleveland, Ohio.

Moncrief Heater Company, Cleveland, Ohio, shows its advantages, declare the makers. However, it is not a warm air heater that is good only in an emergency. Its reliability at all times and its utility distinguish it as an uncommonly serviceable warm air heater, declare the manufacturers. These qualities are being acknowledged by more and more dealers. The Scheible Warm Air Heater can

burn either gas or coal. A gas ring which is installed in these warm air heaters provides an ideal arrangement for the use of gas whenever required, state the makers. When the coal bin becomes empty, or for any other reason the coal supply is cut off, the owner of a Scheible Warm Air Heater in order to provide ample heat in his home merely turns on the gas and lights the fire. According to the manufacturers, this arrangement in no way interferes with the efficient and economical burning of coal as a fuel. The radiation surface in the Scheible Warm Air Heater is unusually large. Tightly constructed, it is a gas and dust-tight heater. More complete details and terms of agency can be obtained from the Scheible-Moncrief Heater Company, 1444 West Ninth Street, Cleveland, Ohio.

RESISTS LONG, HEAVY SERVICE.

A warm air heater that is designed to resist long service is embodied in the Peerless Warm Air Heater,



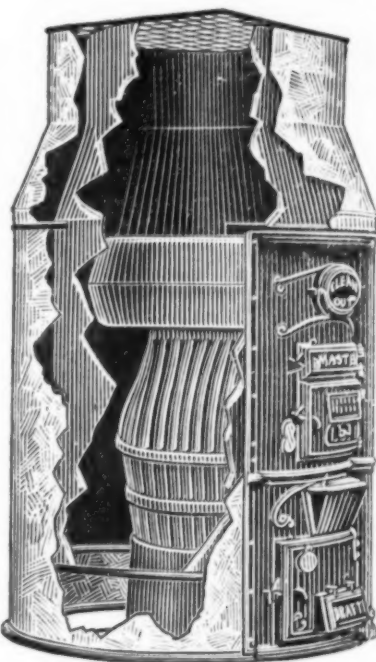
Peerless Warm Air Heater, Made by the Peerless Foundry Company, Indianapolis, Indiana.

state the manufacturers, the Peerless Foundry Company, Indianapolis, Indiana. Built of genuine ingot iron, it presents a sturdy appearance to the eye. Every joint is riveted and calked. This makes it permanently gas tight, claim the makers. A hot blast fire brick fire pot installed in the Peerless Warm Air Heater is of durable

construction and will withstand intense heat and strain, declare the producers. In fact, the Peerless Foundry Company states that no trouble is experienced in changing fire pots in its warm air heaters because they are practically indestructible. A communication to the Peerless Foundry Company, 1853-1955 Ludlow Avenue, Indianapolis, Indiana, concerning its line of warm air heaters will be satisfactorily answered.

MANUFACTURES A STURDY PRODUCT.

One by one the unfounded objections to the pipeless warm air heater are being withdrawn. This is



Master Pipeless Warm Air Heater, Made by the Tubular Heating and Ventilating Company, Philadelphia, Pennsylvania.

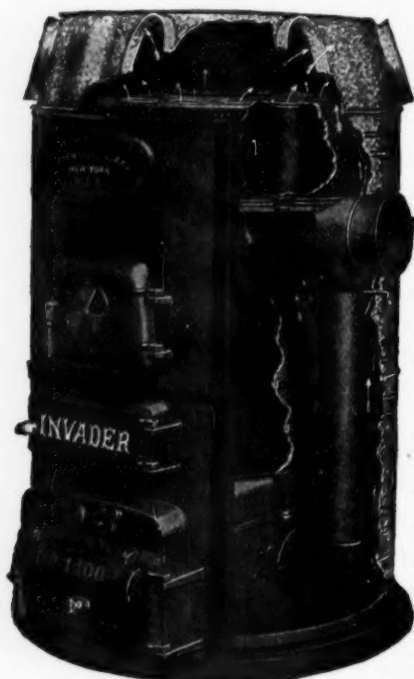
due to two influences. In the first place, the constant improvement being made in pipeless warm air heaters better fits them to meet varied heating requirements. In the second place, the theoretical objections are being overcome by actual demonstration. In this respect, the Master Pipeless Warm Air Heater, shown herewith, made by the Tubular Heating and Ventilating Company, Philadelphia, Pennsylvania, is declared to be free from defects. Its ex-

traordinarily heavy build and its roomy capacity en-

able it to meet the heating requirements of varied dwellings. The sturdiness of this pipeless warm air heater gives it long life. Made of cast iron, the radiator is one solid piece. The feed doors are also cast in one piece and are extra heavy. Properly proportioned, the grate, cold air, and warm air area provide a balanced circulation. The manufacturers declare that the Master Pipeless Warm Air Heater will economically burn various grades of fuel. For complete details concerning agency or for a more complete description of the construction of the Master Pipeless Warm Air Heater, communicate with the Tubular Heating and Ventilating Company, 228 Quarry Street, Philadelphia, Pennsylvania.

SERVICE RECOMMENDS ITS GOODS.

The Invader Warm Air Heaters, illustrated herewith, manufactured by The Union Stove Works, New York City, have been tried out under all conditions



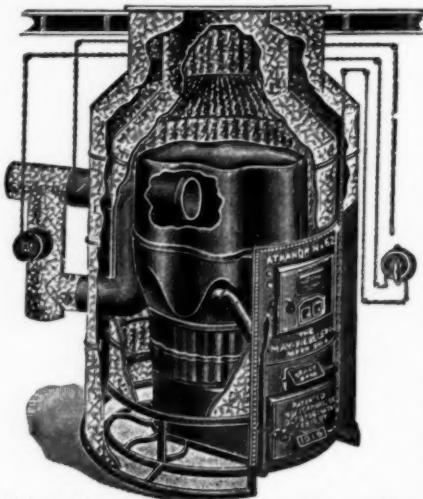
Invader Warm Air Heater, Made by The Union Stove Works, New York City.

over a long span of years, declare the manufacturers. The unanimous expression of satisfaction of users as to the utility of these warm air heaters, aver the makers, is the best recommendation of their efficiency. Every part of the Invader Warm Air Heater is constructed upon the principle of highest service with regard to the build of the heater as a whole. All the compartments are large and roomy. The metal used for the various devices is of the best. Operation of the Invader Warm Air Heater is simple, state the manufacturers. Upon the selection of the heating plant vitally depends the comfort of the home for an indefinite period of years. Therefore, as a sound business principle The Union Stove Works have endeavored in the manufacture of their products to meet the need of comfort for a long period of time in the home. Storm King Warm Air Heaters, Astor Warm Air Heaters, and Storm King Pipeless Warm Air Heaters are also made by The Union Stove Works. Catalogues and detailed information describing any of the warm air heaters mentioned will be gladly furnished upon inquiry to The Union Stove Works, 70 Beekman Street, New York City.

FILLS PARTICULAR HEATING NEED.

In basements of small dimensions the Ath-A-Nor Pipeless Warm Air Heater, depicted herewith, will be

found to meet the requirements, state the manufacturers, The May-Fieberger Furnace Company, Newark, Ohio. When the basement is used for storing



Ath-A-Nor Pipeless Warm Air Heater, Made by The May Fieberger Furnace Company, Newark, Ohio.

vegetables and other eatables, the installation of this pipeless warm air heater will not effect them. Being constructed of all cast iron the Ath-A-Nor Pipeless Warm Air Heater will last an unusually long time. It has the lever shaking grate. Removal of ashes is very easy. A large, self-cleaning radiator gives and abundance of heat and can warm a large volume of air. Due to its particular construction, this radiator will not clog or choke up. The fire pot is extraordinarily heavy. There are many other interesting details of construction in the Ath-A-Nor Pipeless Warm Air Heater. Write to The May-Fieberger Furnace Company, Newark, Ohio, for catalogue and details of agency. The Company has branches as follows: Excelsior Heating Supply Company at Kansas City, Missouri; and Kelly How-Thompson Company, Duluth, Minnesota.

HAS EXTRA LARGE FREE AIR SPACE.

This is the Gilt Edge Liberty Warm Air Heater which is manufactured by R. J. Schwab and Sons Company, Milwaukee, Wisconsin. It is made of all cast iron with



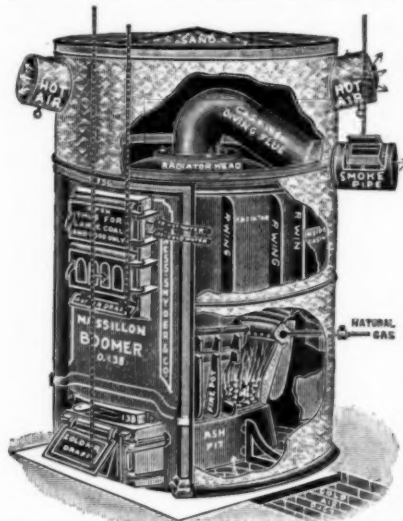
Gilt Edge Liberty Warm Air Heater, Made by R. J. Schwab and Sons Company, Milwaukee, Wisconsin.

an extra heavy fire pot cast in two pieces. This allows space for expansion and contraction which is due to heating and cooling. The makers say it can not crack or buckle and smoke and gases will not escape into the warm air pipes. The Gilt Edge Liberty Heater has a large heating surface and long fire travel, thus extracting all the heat possible from the fuel burned and sending it up through the heating pipes where it belongs. There is an extra large free air space between the heater and the casings which insures good circulation and prevents the waste of heat. The anti-clinker grate is easy to shake and eliminates the danger of accidentally dumping fire into the ash pit. This ash pit is large, in order to make it easy to remove ashes, and prevents the grates from burning out by lack of space between them and the ashes below. The R. J. Schwab and Sons Company, 285 Clinton Street, Milwaukee, Wisconsin, will be pleased to send litera-

ture and agency propositions to those writing for them.

IS BUILT WITH DOUBLE CASINGS.

The Boomer Warm Air Heater shown herewith is six feet high to the top of the casing. Eight inches can be cut off from the casing hood, reducing the height to five feet, four inches. It is made of high grade material and will burn soft coal, coke, wood, or natural gas. For coke, the manufacturers recommend the rocking bar grate; for wood, lay the wood grate on top of the coal grate; and for soft coal, the draw center grate is recommended. This last named grate, when shaken, revolves around a common center, the outer edge traveling the farthest, removing the ashes next to the fire pot first, allowing the hot coals to hug the radiating surface, and admitting air or oxygen at the point where combustion should take place. The center part of the grate can be drawn out to drop clinkers into the ash pit. The casings are made double with an air space of one and a half inches between them. This space is unobstructed from bottom to top, allowing a steady, unbroken flow of cold air to pass between the casings. This prevents an excess of heat being discharged into the cellar. Galvanized iron is used for the outside casing and black iron for the inside casing. Those interested should get in touch with The Hess-Snyder Company of Massillon, Ohio, and secure copies of their literature.



The Boomer Warm Air Heater, Made by The Hess-Snyder Company, Massillon, Ohio.

shaken, revolves around a common center, the outer edge traveling the farthest, removing the ashes next to the fire pot first, allowing the hot coals to hug the radiating surface, and admitting air or oxygen at the point where combustion should take place. The center part of the grate can be drawn out to drop clinkers into the ash pit. The casings are made double with an air space of one and a half inches between them. This space is unobstructed from bottom to top, allowing a steady, unbroken flow of cold air to pass between the casings. This prevents an excess of heat being discharged into the cellar. Galvanized iron is used for the outside casing and black iron for the inside casing. Those interested should get in touch with The Hess-Snyder Company of Massillon, Ohio, and secure copies of their literature.

PUTS AN END TO SMOKE NUISANCE.

It is the claim of the XXth Century Heating and Ventilating Company that they have solved the smoke nuisance while at the same time they have increased the efficiency of the fuel, in the construction of the XXth Century Warm Air Heater, illustrated herewith. The drop front grate that is installed in these warm air heaters can be lowered in front at will. For the removal of obstructions this is a desirable advantage. According to the manufacturers, it prevents a waste of fuel which would otherwise result. The grate has roller bearings, thus increasing its life



XXth Century Warm Air Heater, Made by the XXth Century Heating and Ventilating Company, Akron, Ohio.

The grate has roller bearings, thus increasing its life

and facilitating its operation. Those who use the XXth Century Warm Air Heater are pleased with the ease with which these grates can be handled, declare the makers. The rest for the drop front grate is held firmly in position without bolt or rivet. It can be placed in position or be removed through the ash-pit door. A large circulating chamber in this warm air heater handles a big volume of warm air and feeds it regularly to the heating surfaces. Other details of interest touching on the utility of the XXth Century Warm Air Heater will be sent upon inquiry to the XXth Century Heating and Ventilating Company, Akron, Ohio.

SATISFIES USERS AND DEALERS.

The Beaver One-Pipe Warm Air Heaters have proved satisfactory to users and profitable to dealers, states the Danville Stove and Manufacturing Company, Danville, Pennsylvania, maker of the Beaver One-Pipe Warm Air Heater, illustrated herewith. This one-pipe warm air heater has many individual points of advantage above other warm air heaters, claim the producers. A solid cast iron front presents a handsome appearance to the Beaver One-Pipe Warm Air Heater. Its massive construction suggests strength and durability. A large ash pit prevents the accumulation of ashes and consequently an interruption in the even burning of the fire. Humidity of the air is obtained by a large water pan. Extra air space is provided in the casting used for cold air return. This space has been enlarged, state the manufacturers, to insure a large volume of warm air rather than a small current of overheated air. In addition to the advantage of the large amount of warm air, this feature adds to the life of the warm air heater, claim the makers. Other details describing the profitability of handling the Beaver One-Pipe Warm Air Heaters will be sent upon request to the Danville Stove and Manufacturing Company, Danville, Pennsylvania.



Beaver One-Pipe Warm Air Heater, Made by the Danville Stove and Manufacturing Company, Danville, Pennsylvania.

Humidity of the air is obtained by a large water pan. Extra air space is provided in the casting used for cold air return. This space has been enlarged, state the manufacturers, to insure a large volume of warm air rather than a small current of overheated air. In addition to the advantage of the large amount of warm air, this feature adds to the life of the warm air heater, claim the makers. Other details describing the profitability of handling the Beaver One-Pipe Warm Air Heaters will be sent upon request to the Danville Stove and Manufacturing Company, Danville, Pennsylvania.

The place to begin to save money is on the little items rather than waiting for a chance to make some big spectacular saving—which will never be made.

STOPS WASTE OF HEAT INTO CELLAR.

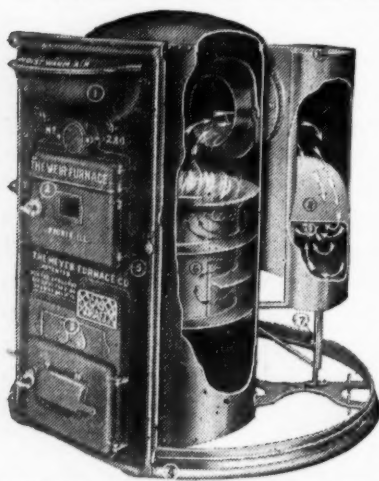
Herewith is shown a sectional view of the Magee One-Pipe Heater, made by the Magee Furnace Company, Incorporated, Boston, Massachusetts. This shows the construction with the one-pipe, one-register feature. The combination outside casing and supply pipe is made of heavy galvanized iron. The inner casing is made of two sheets of iron with air-celled asbestos between. Arrows show the route traveled by air. Cold air descends, warm air ascends. With such a heater, the cellar is always cool; and canned and preserved supplies and vegetables are not endangered by wasted heat from the heater and pipes.

Magee One-Pipe Heater, Made by the Magee Furnace Company, Incorporated, Boston, Massachusetts.

This Magee One-Pipe Heater also has large double feed doors and revertible flue radiator. The water or vapor pan is filled easily from the front. There is a large ash door with a lift draft for the chain attachment. There is a single circular opening register which can be supplied in black japan, oxidized copper or nickel plated. The warm air rising from the heated surfaces in the heater comes through the central opening of this register and the cold air from the rooms returns to the apartment in which the register is placed and finds its way back to the heater through the fret work around the central opening. It passes down to the bottom of the heater and enters the heating chamber to be reheated and kept in circulation. Dealers should get in touch with the Magee Furnace Company, Incorporated, 38 Union Street, Boston, Massachusetts, or Robert P. Burton, Western representative, 30 West Lake Street, Chicago, for further particulars.

COMBINES A CLEAN OUT AND CHECK DAMPER IN SMOKE OUTLET.

The Weir Warm Air Heater is made by The Meyer Furnace Company, Peoria, Illinois, and is shown in the accompanying illustration. The fire pot is made in sections and can be removed or replaced through



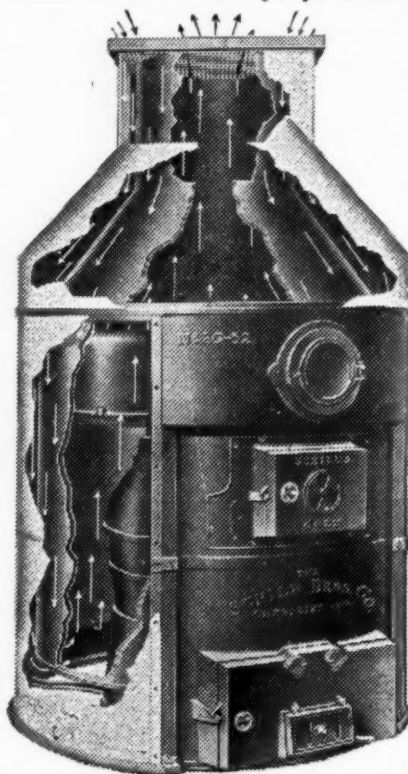
Weir Warm Air Heater, Made by The Meyer Furnace Company, Peoria, Illinois.

The Meyer Furnace Company has made ten points

of improvement on this heater, among them being: The new smoke outlet which combines a check damper and a clean out; Acetylene welded seams on the auxiliary drum which removes the possibility of a leak developing; The new heat deflector; The enlarged casing which allows greater space for the passage of air inside the casing; The water pan which is now placed at the top of the heater where the greater heat will evaporate an increased amount of moisture into the rooms giving an abundance of moist warm air. The Meyer Furnace Company of Peoria, Illinois, has just issued a circular describing this heater which will be sent to anyone asking for it.

IS GAS-TIGHT AND DUST PROOF.

The grate installed in the Cozy Pipeless Warm Air Heater, depicted herewith, manufactured by The Schill Brothers Company, Crestline, Ohio, is of the



Cozy Pipeless Warm Air Heater, Made by The Schill Brothers Company, Crestline, Ohio.

revolving type, and is easily handled. To meet individual requirements a flat grate for wood as fuel can be provided to put over the regular grate. The highest grade of iron is used throughout in the castings of this pipeless warm air heater. The fire pot is cast in two sections. If desired, a one-piece ribbed fire pot to insure increased durability may be had if specified. The outer casing is of galvanized iron and the inner casing is of black iron with a one-inch air space. The Cozy Pipeless Warm Air Heater will burn hard or soft coal or wood with equal facility. It is cup-jointed throughout. This makes it gas-tight and dust proof, assert the manufacturers. For complete particulars regarding the Cozy Pipeless Warm Air Heater dealers should write to The Schill Brothers Company, Crestline, Ohio.

DELIVERS ALL REPAIRS PROMPTLY.

Prompt delivery of all repairs for warm air heaters, stoves, etc., has been its reputation, declares the Omaha Stove Repair Works, Omaha, Nebraska. Nor does their haste distract from the accuracy of filling orders, they state. Parts asked for are sent in the shortest possible time. A large stock is always on hand. Satisfaction with the service given has gained this Company many customers. Dealers requiring repairs on warm air heaters, stoves, etc., should write to the Omaha Stove Repair Works, Omaha, Nebraska.

DESIGNED TO MEET INDIVIDUAL NEEDS.

To meet varied conditions and individual requirements, the Co-operative Foundry Company, Rochester, New York, manufacturers of the Empire Pipeless



Empire Pipeless Warm Air Heater, Made by the Co-operative Foundry Company, Rochester, New York.

Warm Air Heater, depicted here with, furnishes radiators in its warm air heaters of either cast iron or steel. It is said that the ashpit in this particular warm air heater is unusually large and roomy. To retailers who have experienced the ill trend caused in their business relations as a result of customer's dissatisfaction with so seemingly a casual detail as a small ashpit, the sales advantage of a big ashpit will recommend itself. This feature adds to the convenience in the operation of its warm air heaters and is part of the carefully constructed whole which has gained recognition from a large list of users, declare the manufacturers. The grates in the Empire Pipeless Warm Air Heater are of a triangular pattern. No bolts are used to fasten them in place. Removal of the grate bars is, therefore, easy. Each bar can be taken out separately. It is claimed that the deep cup joints characteristic of the Empire Pipeless Warm Air Heater, which are thoroughly cemented, render this heater perfectly gas and smoke-tight. The fire pot is heavily ribbed. It is made in two styles—one piece or two piece. Either one will be furnished if specified. According to the makers, the feed door is of uncommonly large dimensions. There is an opening at the left of the feed door for hot water connections. For a small additional cost, the manufacturers declare that they will furnish gas rings by means of which gas can be efficiently consumed as fuel. Dealers who desire to learn more concerning this interesting product will be enabled to do so by writing direct to the Co-operative Foundry Company, Rochester, New York, or Chicago, Illinois.

CAN BE USED IN SEVERAL WAYS.

The Green Colonial Warm Air Heater, manufactured by the Green Foundry and Furnace Works, Des Moines, Iowa, can be installed as a pipe, pipeless, three-way, or room heater. In any of the enumerated installations it makes a dependable heating system, declare the manufacturers. It is said that the dealer is relieved from carrying a large assortment of stock when the Colonial Warm Air Heater is handled. With this warm air heater it is not necessary to carry a different make for each type of installation. The dome constructed in the Green Colonial Warm air Heater is massive. Especial pride is taken by the manufacturers of these warm air heaters in the heat

radiating capacity of this portion of their product. The firepot is a solid piece of casting, made to withstand intense heating. All doors are large and roomy. According to the manufacturers, the Green Colonial Warm Air Heater is perfectly air and gas-tight. With one Green Colonial Warm Air Heater on your floor, say the makers, you can tell the story in a satisfactory and persuasive manner. A guaranty of five years is given with each heater. A bonus plan which will interest dealers has been prepared by the Green Foundry and Furnace Works, Des Moines, Iowa. Dealers desiring further information concerning this product and the unique and profitable bonus plan of this company should write to them.

ELEVATES STANDARD OF ITS GOODS.

In the accompanying illustration is shown the Hero Pipeless Warm Air Heater manufactured by the Hero Furnace Company, Chicago, Illinois. No effort has been spared to make the Hero line of warm air heaters as complete and practical as modern ingenuity



Hero Pipeless Warm Air Heater, Made by the Hero Furnace Company, Chicago, Illinois.

can accomplish, declare the makers. The fire pot in the Hero Pipeless Warm Air Heater is deeply corrugated inside and outside alike. This serves a double purpose. It increases the strength of the fire pot and enlarges its radiating surface.

The fire pot is deep cup jointed. A high grade of asbestos warm air heater cement is applied to insure perfect insulation and to guarantee against the escape of gas or smoke. The Hero grate bars are a distinct feature of this warm air heater. According to the manufacturers, they have neither cog wheels nor bolts. Each bar acts separately and any one of them can be removed without disturbing the fire. A new bar can be replaced in a few minutes, say the producers.

It is said that in the Hero Pipeless Warm Air Heater in order to clean a dirty grate bar it is not necessary to shake the entire grating—the individual bar can be manipulated without interfering with the rest of the device. A roomy vapor pan is supplied with these warm air heaters which is adequate to supply the proper amount of moisture to the air. The ash pit is large, facilitating removal of ashes. Many more details of interest concerning this line of warm air heaters can be obtained by writing to the Hero Furnace Company, 57 West Lake Street, Chicago, Illinois.

CALLS ATTENTION TO LARGE GRATING.

The Wells Furnace and Supply Company, manufacturers of the Great Northern Pipeless Warm Air Heater, in the accompanying illustration, calls par-



Great Northern Pipeless Warm Air Heater, Made by the Wells Furnace and Supply Company, St. Louis, Missouri.

particular attention to the extra large register face used in their pipeless warm air heating system. An abundance of cold air is admitted by means of the enlarged register face. The convection of the warm air is thereby increased. According to the manufacturers of the Great Northern Pipeless Warm Air Heater, their product is able sufficiently to heat the large amount of air that is drawn into it. An all cast radiator of large dimensions is installed in these pipeless warm air heaters. It is constructed to extract the most heat possible from the fire and smoke. The Faultless Triangular Grate built in the Great Northern Pipeless Warm Air Heater can be removed in a comparatively short time without disturbing the fire. Each bar can be removed separately. There are no bolts or cotter pins to take out. No special tools are necessary for the removal of the grate bars. This pipeless warm air heater is all cast iron with full solid fronts. There are no wings or extension pieces. Dealers should write to the Wells Furnace and Supply Company, 1522 Olive Street, St. Louis, Missouri, for complete information concerning the Great Northern Pipeless Warm Air Heater, which will be promptly furnished upon request.

ALLOWS USE OF LOW GRADE COAL.

A sectional view of the Modern Way Pipeless Warm Air Heater, made by the Modern Way Furnace Company of Fort Wayne, Indiana, is shown in the accompanying illustration.



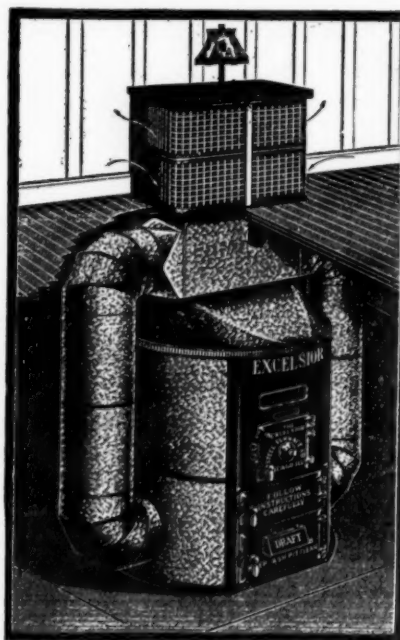
Modern Way Pipeless Heater, Made by Modern Way Furnace Company, Fort Wayne, Indiana.

The casing is made with a cone-shaped hood, the inner jacket being lined with asbestos and corrugated tin entirely to the top of the hood, thus insuring good insulation. All heaters are equipped with the regular corrugated, two piece fire pot unless otherwise ordered. The one piece slotted fire pot is supplied at a small extra charge. All Modern Way heaters have revolving, triangular bar grates, suitable for burning any kind of fuel, which are easily cleaned. Each bar is hung separately so that it is not necessary to buy an entire grate should one burn out. Any bar can easily be replaced without removing the

fire. The radiator is cast in one piece, making it practically impossible for gas or smoke to escape. It has a large smoke traveling capacity which allows the burning a very low grade of coal. The Modern Way Pipeless Heater is a safe heater. The space taken up by a stove can be utilized to better advantage. It is economical because it burns any kind of fuel with no unnecessary loss of heat. There is no danger from overheated warm air pipes. The Modern Way Furnace Company will be pleased to send literature on this heater to any one addressing this Company at Fort Wayne, Indiana.

INCREASES ITS CIRCULATION OF AIR.

More rapid circulation of air is said to be obtained by the use of the pedestal register installed in connection with the



Excelsior Pedestal Monopipe Warm Air Heater, Made by The Excelsior Steel Furnace Company, Chicago, Illinois.

Excelsior Pedestal Monopipe Warm Air Heater, depicted herewith, manufactured by The Excelsior Steel Furnace Company, Chicago, Illinois. Owing to the vertical construction of this register it is said to be sanitary, as occupants of the house in which it is installed can not walk over it and thus do not scrape the dirt off their feet on the register. The smoke outlet in the

Excelsior Pedestal Monopipe Warm Air Heater is of unique construction. According to the manufacturers it is designed to resist gases so as to allow them to be transmitted to the passing air without excessive losses of heat. It is set in the dome in a deep slot. This arrangement, it is said, avoids leakage of gas. Extra precautions are taken against the escape of gas from this point by a collar which is bolted to the flange on the dome. For an interesting catalogue concerning this product write to The Excelsior Steel Furnace Company, 114-18 South Clinton Street, Chicago, Illinois.

DETERMINES HEATING CAPACITY.

Each Detroit Jewel Warm Air Heater, manufactured by the Detroit Stove Works, Detroit, Michigan, is subjected to accurate tests to determine their heating capacity in cubic feet. As a result there is no guesswork in selecting the proper heater for a certain place, declare the manufacturers. Nor is there anything left in the dark as to the return in service for the amount of money expended. The heating power in the Detroit Jewel Warm Air Heater is guaranteed.

According to the makers, the radiation surface of these warm air heaters is uncommonly large. The grates, firepot, combustion dome and radiator are all designed to save fuel. A tough, smooth iron is used for castings. Such conveniences designed to make operation easy is installed as duplex ball bearing grates, extra large fire and ash pit doors, new type cleanout, perfect draft control. Many other features increase the quality of the Detroit Jewel Warm Air Heater, over the manufacturers. A patented humidifier designed adequately to supply warm air to all of the rooms is installed in all Detroit Jewel Warm Air Heaters. The Detroit Stove Works, Detroit, Michigan, takes pride in explaining to dealers and installers the merits of the Detroit Stove Works and the desirability of an agency.

BUILDS WITH SCIENTIFIC ACCURACY.

The Mahoning Foundry Company, Youngstown, Ohio, are the manufacturers of the Type "C" Mahoning Warm Air Heater, shown in the accompanying illustration. It is said that this warm air heater is designed with scientific accuracy to secure efficient heating with the greatest convenience to the owner. Great care has been exercised to eliminate any intricate details of construction which would tend to confuse the user, and in their place have been supplied simpler parts, declare the makers. According to the manufacturers of Mahoning Warm Air Heaters, the self-cleaning features in this heater insure an adequate amount of heat at all times. The illustration herewith shows how combustion takes place in the Type "C" Mahoning Warm Air Heater. It is described as follows: Air reaching the fire through the slots in the fire pot causes combustion all around the outside of the coal heap. Thereby, the hottest part of the flame is brought in direct contact with the outside surface of the heater from which the heat is radiated. The large radiator and the diving flue extend the length which the fire has to travel. It is the claim of the company that the radiating surface thus enlarged is able to extract the highest amount of heat units from the quantity of coal used. The grate installed in this warm air heater is of the Ball Bearing Duplex type. It consists of a main frame with ball bearings on which the annular shaking ring revolves, and the two duplex grate bars connected with gears for breaking and dropping the clinker in the center. The grate is supported on two steel angles which are bolted to lugs in the ash pit. Throughout, this grate is said to be sturdy and to be able to withstand the strain of long and heavy service. The Mahoning Foundry Company takes pride in all its products. To dealers interested it will be pleased to furnish a complete set of catalogues fully describing all of the Mahoning Warm Air Heaters produced. Our experience both in manufacturing and distributing warm air heaters is at your service, declares this company. Not until the consumer is pleased with our products are we satisfied, they aver. Dealers are invited to write to The Mahoning Foundry Com-

pany, Youngstown, Ohio, for their catalogue or concerning details of agency for Mahoning Warm Air Heaters.

MEETS VARIED HEATING DEMANDS.

Each in his place, is the motto of the army. It makes for efficiency. A misfit in any place throws everything connected with it out of harmony. The warm air heater industry is not exempted from the



Radiant-Home Air Blast Fire Pot, Made by the Germer Stove Company, Erie, Pennsylvania.

law of harmony, and the proper placing of individually constructed products. Pipeless Warm Air Heaters have their distinctive and proper uses. They fit requirements which could not conveniently be filled by

any other product. The same applies to each and every make of warm air heater. Realizing this fact the Germer Stove Company, Erie, Pennsylvania, declares it is prepared to supply all the needs demanded of warm air heaters. Its Radiant-Home Warm Air Heaters are manufactured in three styles—pipe, pipeless, and room heater. Illustrated herewith is the Radiant-Home Air Blast Fire Pot, made by the Ger-

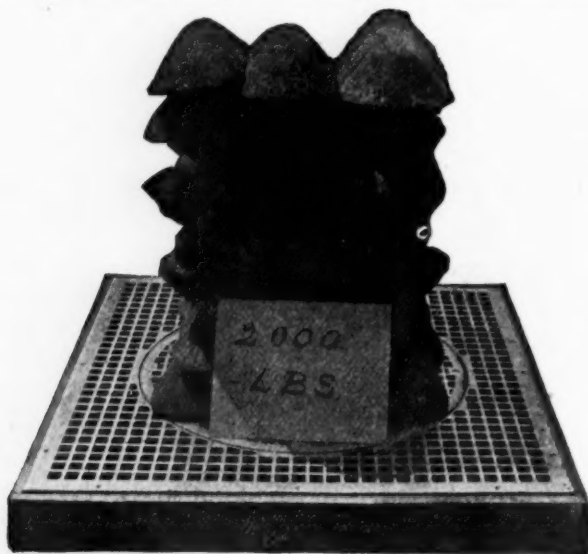


Type "C," Mahoning Warm Air Heater, Made by The Mahoning Foundry Company, Youngstown, Ohio.

mer Stove Company. This product is installed in their make of warm air heaters. From the illustration it can be seen that this fire pot is of an uncommonly durable make. The heavy ribs are said to give it added strength. They also safeguard against cracking. Gas rings which enable the user of these warm air heaters to use gas as a fuel can be furnished, if specified, at an additional cost. Dealers interested in these products and who desire more exhaustive information than here given should write to the Germer Stove Company, Erie, Pennsylvania.

DUPLEX GRATING IS STRONG ENOUGH TO STAND A TON PRESSURE.

The Duplex Grating, made by The Walworth Run Foundry Company of Cleveland, Ohio, is shown in the accompanying illustration with 2,000 pounds of pig iron resting on it. This grating is made of cast iron, and is said not to rust. The manufacturers state that it will not warp when subject to extreme heat

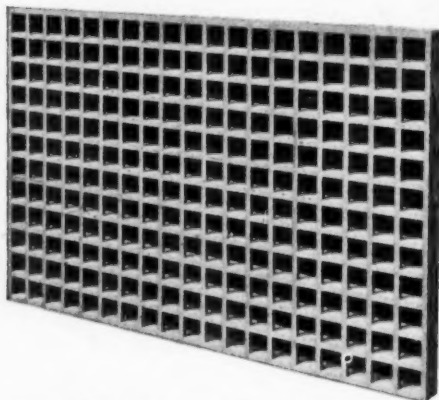


Duplex Grating, Made by The Walworth Run Foundry Company, Cleveland, Ohio.

and will not bend when subject to extreme weight. This Duplex Grating has been tested with the 2,000 pounds of pig iron without any damage and the Company states that a few hundred in excess to this weight can be added. All gratings have the maximum air capacity. These gratings are made in seven standard sizes from 22 x 24 to 45 x 45. The manufacturers carry a complete stock and can fill orders for any quantity promptly. Those interested should write for catalogue and discount sheet to the Walworth Run Foundry Company, West 27th Street and N. Y. C. & St. L. R. R., Cleveland, Ohio.

DOVER WOOD FACES ARE SAID TO BE FREE FROM IMPERFECTIONS.

The Dover Wood Face and Lumber Company of Dover, Ohio, makes the Dover Wood Cold Air Faces. They are built of high grade, select material. Absolutely dry lum-



Dover Wood Cold Air Face, Made by The Dover Wood Face & Lumber Company, Dover, Ohio.

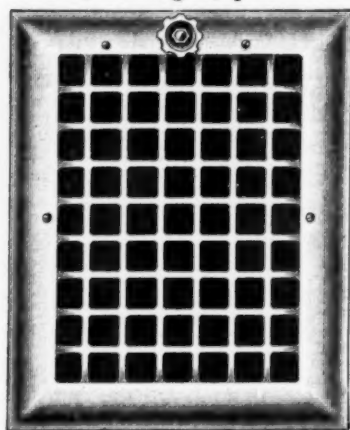
ber is used, so that there will be no shrinkage from drying after the face is once made. All knots and other defects are eliminated as the Company states that there is enough hand-

work in the construction of wood faces to detect and thus discard all defective sticks. These faces are adaptable to any spot; in the

floor, the window seat, under the stairway, etc. Orders for any special style or shape of face are taken, such as a curved face. The face in the accompanying illustration shows a mesh $1\frac{1}{4}$ inches by $1\frac{1}{4}$ inches, approximately. Variation from this size is said never to exceed one-fourth inch. It is light in weight, can be easily removed for cleaning purposes and has sufficient strength for use in houses in connection with the installation of the warm air heater. For further information, dealers should address The Dover Wood Face and Lumber Company, Dover, Ohio.

PRESENTS ATTRACTIVE APPEARANCE.

Neat in design Stearns' Convex Steel Wall Register, manufactured by the Stearns' Register Company, Detroit, Michigan, presents an attractive appearance



Stearns' Convex Vertical Steel Wall Register, Made by the Stearns' Register Company, Detroit, Michigan.

when installed. Illustrated herewith is a Vertical Stearns' Convex Steel Wall Register. This Company also manufactures horizontal convex steel wall registers, as well as steel base registers. All of the products of the Stearns' Register Company have a distinctiveness and attractiveness that mark them far superior

to the ordinary make of registers, over the makers. These registers represent a desideratum in construction. They are sturdily built and highly finished. The manufacturers guarantee them against breakage. Uniformity is strictly adhered to throughout in the production of its registers, declare the manufacturers. Stearns' Steel Base Registers can be furnished in five sizes, from 8x10 to 11x13, in black or white japan or electro-plated finishes. The Convex Steel Wall Registers are neatly designed and can also be had in black or white japan or electro-plated finishes, in sizes from 8x10 to 9x12. Complete details are obtainable from the Stearns' Register Company, 111 Fort Street, Detroit, Michigan.

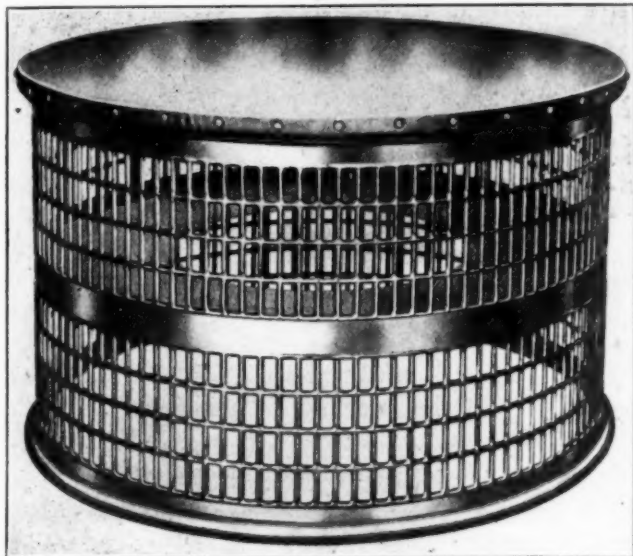
PEDESTAL REGISTERS GAIN FAVOR.

Illustrated herewith is the Oval Pedestal Register for One Pipe Warm Air Heater, manufactured by the Hart and Cooley Company, Incorporated, New Britain, Connecticut. A deflector underneath the wood top of this type of register throws the heat out through the perforations and also forms a vacuum to protect the wood top. Besides the oval type of One Pipe Warm Air Heater Pedestal Register, this company manufactures an oblong type. On the oblong type the deflector runs from the bottom of the rear side to the front of the top and deflects the heat out through the front of the register. The cold air is taken from each end of the oblong registers.

The sides of these pedestal registers for one pipe

warm air heaters are made of steel perforated similar to the regular line of Hart and Cooley registers. They can be finished in any shade that is desired. The molding is of wood. The top also is of wood covered with leatheroid.

The type of registers for one pipe warm air heater described above is more desirable in many places than

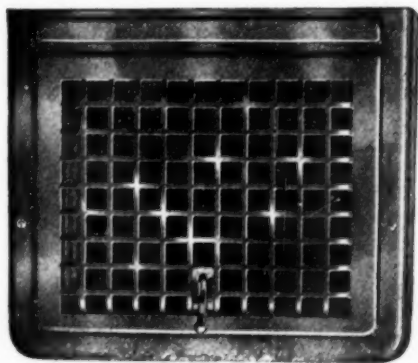


Oval Pedestal Register for One Pipe Warm Air Heater, Made by the Hart and Cooley Company, Incorporated, New Britain, Connecticut.

the ordinary type of register. In fact, the increasing demand proves that dealers and installers are becoming aware of the utility of these particular products. Pedestal registers along the types depicted herewith can be made to meet various specifications. Details can be obtained from the Hart and Cooley Company, Incorporated, New Britain, Connecticut.

CONSTRUCTS DURABLE REGISTERS.

The Auer Baseboard Grill Register, shown in the accompanying illustration, manufactured by The Auer Register Company,



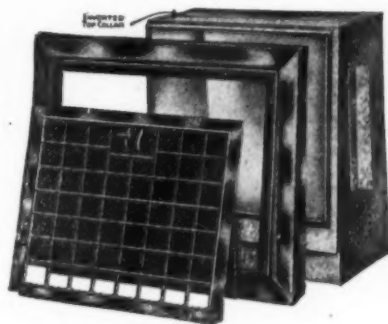
Auer Baseboard Grill Register, Made by The Auer Register Company, 403 Long Avenue, Cleveland, Ohio.

Being neatly designed and durably constructed. Being manufactured from a tested grade of sheet steel, the quality of this register is not questionable. These registers have a deep frame, which, according to the makers, telescopes into the register box making a tight fitting connection. Fastening the Auer register to the wall is done with two round head screws which are furnished with the register. These are screwed into the studs. It is the claim of the manufacturers of Auer Baseboard Grill Register that the above method is the only way that registers can be drawn tightly and securely to the wall. The various types of the register depicted herewith are said

to fit the same boxes. They also fit boxes of several other makes of Auer registers, declare the manufacturers. In the interesting catalogue issued by The Auer Register Company, their complete line of registers is described. A booklet, entitled "The Register Book Number 20," is in the course of preparation and will be ready for distribution in January, 1920. By writing to The Auer Register Company, 403 Long Avenue, Cleveland, Ohio, dealers will obtain this company's present interesting assortment of literature and will have their names recorded as desiring a copy of the new catalogue to be issued by this company.

PREVENTS STREAKING OF WALLS.

Illustrated herewith, is the Rock Island Register made by the Rock Island Register Company, Rock Island, Illinois. It is claimed for this product that it does away with streaking of the walls. This feature



Parts of Rock Island Register, Made by the Rock Island Register Company, Rock Island, Illinois.

is made possible by an expending, interlocking, slip-joint connection. The steel frame is placed over the single metal projection on the box and is then fastened to the box. Then the grill is inserted in position at the bottom of the frame and

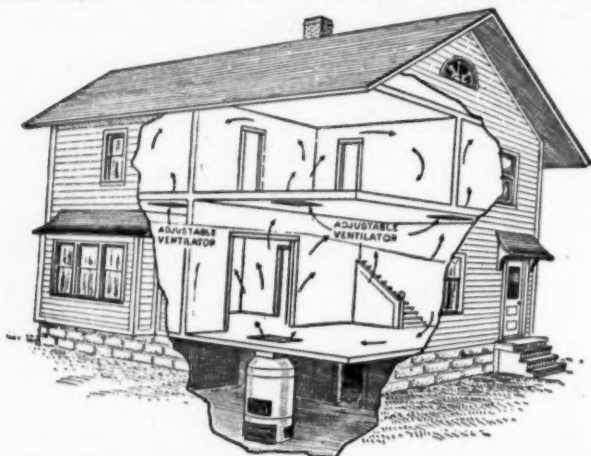
pushed back into place, thereby automatically expanding the single metal projection of the box out between the frame and grill. The grill is then secured with two large oval bolts, and thus a perfectly tight joint is said to be obtained without any additional labor over the usual connecting operations. Besides the technical perfections of the Rock Island Register, the manufacturers state that its neat appearance adds to its utility. Other distinctive features enumerated by the manufacturers are the steel frame and removable grill with large free air opening, and malleable lever. This lever can be easily operated by either hand or foot. Recessed top collars allow for full two inch trimming space above and around the box. The Island City Register is also manufactured by the Rock Island Register Company. This product is made to fill all requirements for high class registers without box, state the makers. A catalogue illustrating the many styles and makes of Rock Island Registers will be sent to dealers if they write to the Rock Island Register Company, Rock Island, Illinois.

UTILIZES ALL THE SURPLUS HEAT.

With the use of the Independent Adjustable Ceiling Ventilators, depicted herewith, manufactured by the Independent Register and Manufacturing Company, Cleveland, Ohio, the surplus heat of the lower rooms is utilized on the upper floors. By convection heat always rises. For instance, should there be no inlet in the ceiling for the warm air to penetrate it

would be partly wasted. However, with its natural pressure and by means of the registers illustrated herewith, declare the makers, the upper rooms would be warmed.

Illustrated herewith is the Independent Adjustable Ceiling Ventilator with the ceiling plate removed. The ceiling plate in this device is an important feature. It is said that an open ceiling face is essential, as it provides means of reaching the interior to make the adjustment and connection of the two boxes at the time



Showing Installation of Independent Adjustable Ceiling Ventilator, Made by the Independent Register and Manufacturing Company, Cleveland, Ohio, and the Circulation of Warm Air in Upper Rooms.

of installation. The entire grill can easily be removed. The connection between the parts can be made by one person in a comparatively short time. According to the makers, with the removable grill placed in position the appearance of it in the ceiling is that of a solid face plate.

Each ventilator or register is complete in itself. It consists of a floor register with valves, a ceiling plate,

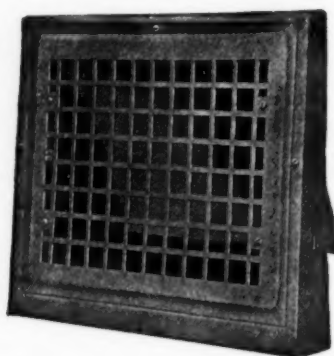


Independent Adjustable Ceiling Ventilator, Made by the Independent Register and Manufacturing Company, Cleveland, Ohio.

and a sheet metal box. The box is adjustable. It can be set at any length from 7 to 12 inches. Connection between the parts is made by two spiral springs. These springs hold the device in position. The grill of the ceiling plate is easily removed. The floor register is black japanned; the ceiling plate is white. The Independent Register and Manufacturing Company, Cleveland, Ohio, will gladly answer inquiries addressed to them.

CAN BE HAD IN EITHER STEEL OR IRON.

In the accompanying illustration is the "T&B" Baseboard Register, manufactured by the Tuttle and



"T&B" Baseboard Register, Made by the Tuttle and Bailey Manufacturing Company, New York City.

Bailey Manufacturing Company, New York City. This type of registers is made in steel and cast iron. The one depicted herewith is made of steel. It consists of two pieces. The grating is of plain lattice design. If desired, other designs can be furnished. The stack heads on all "T&B" Registers are of standard size.

"T&B" Registers are fitted with air tight fasteners, which prevent the streaking of the walls. The deflectors installed in these registers are easily operated. The manufacturers declare that even after long usage they will not stick and become immovable. When placed in a position, they will stay there. Besides the type of register described herewith, this company manufactures an extensive line of gratings, registers, and ventilators to be used in connection with pipeless warm air heaters. It is said that all of their work is of a high quality. Workmanship and material are of tested and known values. Dealers desiring information relative to a dependable line of gratings, registers, or ventilators should communicate with the Tuttle and Bailey Manufacturing Company, New York City.

DOES AWAY WITH SOLDER AND RIVETS.

Illustrated herewith is the Broadway Elbow, manufactured by the W. E. Lamneck Company, Columbus, Ohio. It is made in two pieces. Each piece is a 45-degree elbow and



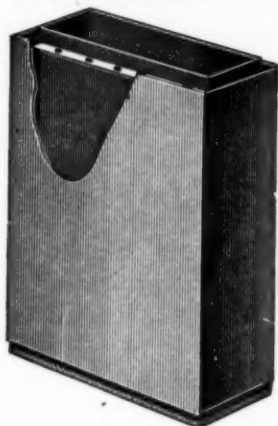
Broadway Elbow, Made by The W. E. Lamneck Company, Columbus, Ohio.

can be used separately if desired. A special locking device enables the pieces to be connected as tight as one piece of pipe without the use of solder, rivets, bolts, or screws, state the manufacturers.

The W. E. Lamneck Company, Columbus, Ohio, makes Simplified Warm Air Heater Fittings. These fittings are the result of many years' experience in actually installing all types and sizes of warm air heaters, and are constructed to meet all practical requirements, declare the manufacturers. A simplified catalogue describing the entire line of Lamneck Simplified Warm Air Heater Fittings will be sent upon inquiry to The W. E. Lamneck Company, Columbus, Ohio. Chicago, Illinois distributor, Central Heating Supply Company, 131 West Lake Street, Chicago, Illinois.

MAKES STANDARD LINE OF GOODS.

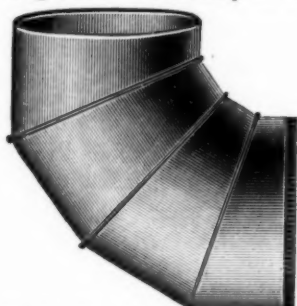
It would be needless to tell the installer or dealer of warm air heaters who knows his business, that in order to guarantee the heater he installs to give the utmost service obtainable, he must use a reliable grade of fittings. But this is true. With the vast amount of varieties on the market it is difficult, sometimes, to select a product that would meet the exacting requirements. And dealers should well observe that they do get the best for the price they are willing to pay. Outstanding among the many grades of warm air



Double Wall Pipe, Made by The Henry-Miller Foundry Company, Cleveland, Ohio.

heating specialties, are Moncrief products, declares The Henry-Miller Foundry Company, Cleveland, Ohio. Illustrated herewith are two of their wares. The Moncrief double wall pipe depicted herewith is of the fire-preventive variety. Being machine-made, state the producers, every joint is easily fitted and remains firmly in place. These pipes are made of the highest grade bright tin.

Moncrief Round Pipe is made in five-foot sections. Its accuracy is carefully guarded. The Moncrief four-piece Stationary Elbow, depicted herewith, is manufactured of a select quality tin. Its angle is 84 degrees. Durability is its main attribute, declare the makers. It has been acclaimed by a long list of satisfied users, is the statement of the manufacturers. Besides the articles described above, the Henry-Miller Foundry Company manufactures galvanized iron elbows, adjustable joints, double-pipe boots, registers and fittings, Y-branches, etc. A communication to The Henry-Miller Foundry Company, Cleveland, Ohio, concerning their products will be promptly answered.

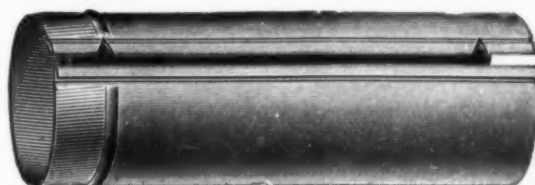


Single Pipe Elbow, Made by The Henry-Miller Foundry Company, Cleveland, Ohio.

USES TESTED MATERIALS IN PIPES.

The Michigan Nested Hot Air Pipe, illustrated herewith, made by the Michigan Safety Furnace Pipe Company, Detroit, Michigan, is made of tested materials. The trend of inventions is to reduce the space required for installing. Space, like time, is valuable. A stock of the pipes manufactured by the Michigan Safety Furnace Pipe Company can be kept in one-thirtieth the space required for other makes, states the maker. They are packed in an iron cask which insures easy handling. When received from the manufacturer, these pipes can be kept in the original package until used. Michigan Nested Hot Air Pipe is said to be the only pipe made that has a safety locking

device at both ends. In assembling them no tools are necessary. The special locking device after once fastened will not come loose unless released, aver the producers. A complete catalogue, fully describing the Michigan Nested Hot Air Pipe, Michigan Adjustable



Michigan Nested Hot Air Pipe, Made by the Michigan Safety Furnace Pipe Company, Detroit, Michigan.

Elbows, and Michigan safety Warm Air Heater Pipe, will be sent on request to the Michigan Safety Furnace Pipe Company, 113-115 East Fort Street, Detroit, Michigan.

RESISTS ALL CORROSIVE ELEMENTS.

Warm air heaters, as a general rule, are durably built. They last for a great length of time. Other parts that are used in connection with them should also be sturdily constructed. The Waterloo Register Company, Waterloo, Iowa, manufacturers of the Everlasting Cast Iron Smoke Pipe, illustrated herewith, state that the life of the average smoke pipe is from one to two years. A cheaper grade of fuel lessens its life. This does not apply to the Everlasting Cast Iron Smoke Pipe, claim the manufacturers. Because of the material used in its production, the action of corrosive elements does not affect it. Consequently, it will last as long as the warm air heater in connection with which it is installed, aver the makers. These smoke pipes are built



Everlasting Cast Iron Smoke Pipe, Made by the Waterloo Register Company, Waterloo, Iowa.

in sections and in lengths to fit any desired distance. Installation is easy. Built in sections, it is interchangeable. It nests for shipping or storage, thus saving much in freight rates and room. Everlasting Cast Iron Smoke Pipe is made in two-foot, one-foot and six-inch sections, with 45 degrees and 90 degrees elbows; in eight-inch, nine-inch and ten-inch diameters. They can be used in connection with any type of heating plant. Descriptive circulars and prices can be obtained by writing the Waterloo Register Company, 137 Rath Street, Waterloo, Iowa.

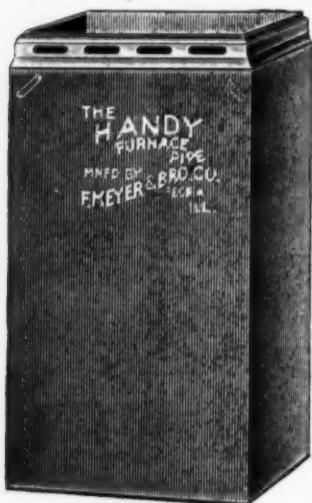
SUPPLIES STOVE REPAIRS PROMPTLY.

The Central Stove and Furnace Repair Company, Chicago, Illinois, declares that at all times it is prepared to fill orders for repairs for stoves, ranges, and warm air heaters. No matter what make the stove, range or warm air heater may be, this company can supply the proper part. The company also carries a full line of water fronts and water backs for cook stoves and ranges. At all times they give prompt serv-

ice. Specifications are carefully complied with, states the Central Stove and Furnace Repair Company. It is always the aim to meet the requirements of customers as stated by them. A large stock is constantly on hand. Proficient and quick service are offered by the Central Stove and Furnace Repair Company, 1801 Diversey Parkway, Chicago, Illinois.

STOPS OVERHEATING OF WALL PIPES.

The main purpose in the construction of the Handy Warm Air Heater Pipe, illustrated herewith, made by the F. Meyer and Brothers Company, Peoria, Illinois,



Handy Warm Air Heater Pipe,
Made by the F. Meyer and
Brothers Company,
Peoria, Illinois.

is to produce a device that would prevent fire from overheating wall pipes. Its success has been proved, state the makers, and the satisfaction of users has greatly increased the sales of this product. The most distinctive feature in this pipe is the connecting slip. It is unusually long and is so arranged that it will fit together without any effort on the part of the installer, declare the manufacturers. Much labor and time are saved and a satisfactory job is made as a result of the Handy Warm Air Heater Pipe, claim the producers. The F. Meyer and Brothers Company will make estimates of everything needed to complete a job. All that is required is a sketch of the building to be heated, size of rooms, height of ceilings, and location of chimney. Dealers desiring complete details will receive adequate information upon addressing the F. Meyer and Brothers Company, Peoria, Illinois.

MAKES A HANDY ASBESTOS CEMENT.

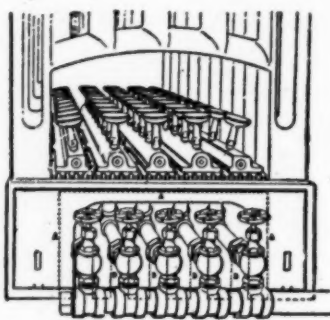
In no other heating apparatus is it as necessary to get as perfect fitting and air tight joints as in warm air heaters. The Nickel Plate Stove Polish Company, Chicago, Illinois, manufactures an asbestos cement which can be efficiently employed by warm air heater manufacturers and installers. It is claimed for this product that it is acid and fire-proof. Only the best asbestos materials are used in its composition. According to the manufacturers, all cans made by them of this product are of uniform quality. When applied it will adhere firmly to the metal. Besides the product mentioned above the Nickel Plate Stove Polish Company makes an excellent line of stove and metal polishes, black and aluminum enamels, hand cleansers, stove putty, etc. For samples and prices on Russian Asbestos Cement write to the Nickel Plate Stove Polish Company, 358 East Illinois Street, Chicago, Illinois.



Can of Russian
Asbestos Furnace
Cement, Made by the
Nickel Plate Stove
Polish Company,
Chicago, Illinois.

MANUFACTURES GAS BURNING DEVICE.

Without taking the pessimistic point of view, one can state coal shortages are liable to come about at any time. It is well to be prepared for such events,



Standard Gas Saving Burner, Made
by Standard Heating and Ra-
diator Company, Pitts-
burgh, Pennsylvania.

declares The Standard Heating and Radiator Company, Pittsburgh, Pennsylvania, manufacturers of the Standard Gas Saving Burner shown in the accompanying illustration. These burners applied to warm air heaters, steam and hot water heating boilers produce large amounts of heat in a comparatively short time. For warm air

heaters, the horizontal round burner is used. On this device the flames come from the sides of the circular top of each individual burner. Each burner has a separate mixer. The upright round burners can be used for any house heaters that have round fire pots. It is said that these burners utilize to the full extent the heat energy in the gas consumed. The Standard Heating and Radiator Company, 100 Barbeau Street, Pittsburgh, Pennsylvania, will gladly supply complete information to those interested in the Standard Gas Saving Burner.

ITS PRODUCTS ARE STRONGLY MADE.

Illustrated herewith is a "Front Rank" Boot, manufactured by the Haynes-Langenberg Manufacturing



"Front Rank" Boot, Made by the
Haynes-Langenberg Manufactur-
ing Company, St. Louis,
Missouri.

Company, St. Louis, Missouri. The strength of this product, declare the manufacturers, has been determined in actual usage. Its seams are strongly clamped together and will withstand unusual strain. By means of this boot perfect fittings are obtained, state the makers. All its meas-

urements are uniform. The complete line of fittings for warm air heaters maintained by the Haynes-Langenberg Manufacturing Company are said to be made with the accuracy which characterizes the boot depicted herewith. Only the materials which have been found best to answer the purposes are used. The Haynes-Langenberg Manufacturing Company, 4058 Forest Park Boulevard, St. Louis, Missouri, will send detailed information to those who write them for it.

CARRIES LARGE STOCK OF REPAIRS.

The large number of different makes of stoves and warm air heaters on the market makes it difficult at times to obtain the desired repair. It is almost inconceivable that a stock of repair patterns to fit over

100,000 makes of stoves and warm air heaters could be supplied by one company. However, the National Stove Repair Company, Miamisburg, Ohio, successors to the Stove Repair Department of the J. B. Morris Foundry Company, Cincinnati, Ohio, announces that it can fit over 100,000 makes of stoves and warm air heaters with repairs. Its extensive stock and efficient methods enable it to give prompt delivery, declares this company. A communication to the National Stove Repair Company, Miamisburg, Ohio, concerning any detail of stove or warm air heater repairs, will be promptly answered.

WARM AIR HEATER SAFETY CHAIN IS SUPPLIED IN VARIOUS FINISHES.

The No. 00 Safety Chain which is shown in the accompanying illustration, is used by manufacturers of warm air heaters automatically to regulate the drafts and by makers of thermostats to regulate the warm



No. 00 Safety Chain, Made by The Corbin Screw Corporation, New Britain, Connecticut.

air heaters. The Corbin Screw Corporation of New Britain, Connecticut, has specialized in making this chain. It can be furnished in either steel, sherardized, nickel plated, brass or brass nickel-plated, as may be required. This Safety Chain is put up regularly in packages of thirty-six feet and can be furnished on reels in running lengths of five hundred feet or cut to the exact length required. Warm air heater makers will find it greatly to their advantage to get in touch with The Corbin Screw Corporation, New Britain, Connecticut.

SEEKS TO IMPROVE REPAIR BUSINESS.

It is the aim of The Northwestern Stove Repair Company, Chicago, Illinois, to make the stove repair business more satisfactory to the customer and more profitable to the dealer. To accomplish this end they strive to eliminate all delays and annoyances. All the aid possible is given the retailer in selecting the proper repairs. Orders are shipped out as promptly as their well organized stock and efficient system of service permits, declares The Northwestern Stove Repair Company. It is said they have the largest stock of repairs for stoves and warm air heaters in the world. If you have tried to get some repair part for a heater and have met with no success, try us, says The Northwestern Stove Repair Company. Also, it is said, they fill orders with precision, doing away with the necessity of repeatedly sending back because of wrong parts forwarded. The Northwestern Stove Repair Company has published a handy stove and warm air heater repair chart. Dealers will find this chart a great aid in selecting the proper part to be replaced. A communication to The Northwestern Stove Repair Company, 654-666 West Roosevelt Road, Chicago, Illinois, regarding any detail of its products will be promptly answered.

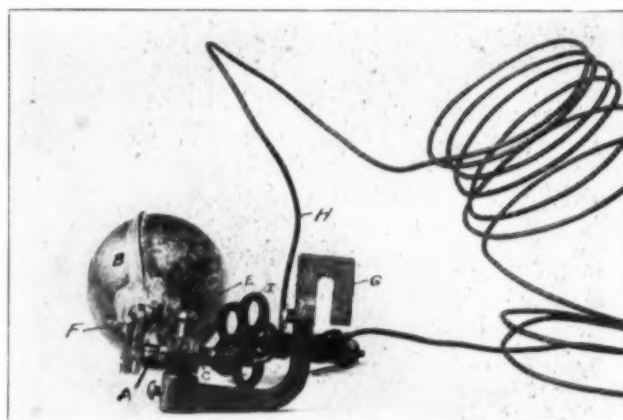
Getting into debt is like dropping from a balloon. Getting out again is like climbing a greased pole.

A NEW AUTOMATIC FLOAT VALVE.

There have been many kinds of float valves used for supplying water to a water pan located somewhere in a furnace casing. Some have been designed for the purpose, while others have been adapted to this service.

Most of these valves have been located in a container outside of the furnace casing. The evaporating pan itself in this case is connected to this outside float chamber with suitable piping. This means, while usually satisfactory from an operating standpoint, extra piping and joints that may leak, an apparatus in the basement that is often in the way, and added first cost for the unnecessary extra water container.

The other type which requires no float chamber outside of the furnace casing, is rigidly connected to the water pan which must of necessity be slightly movable due to the expansion and contraction of the furnace. This is particularly bad when the connection is below



New Automatic Float Valve for Evaporating Pans in Warm Air Heaters.

the water level. This type of connection makes it necessary for most people to hire the services of a plumber when repairs become necessary.

Much trouble and dissatisfaction have resulted from automatic float valves installed and used for this service in warm air furnaces. This is due to faulty design in part, but very largely from the type of service to which the valves are subjected. The evaporation from the water pan is relatively very slow, and the amount of water to be supplied varies from nothing to less than a gallon an hour. This means that the valve will operate "cracked open" very slightly. The velocity of the water through this "crack" will be high when the valve is connected to the city water supply. Invariably this small stream of water occurs on one side only of the valve seat and in a relatively short time a groove is worn in the valve seat. This causes leaks when the valve should be shut off, and will lead to possible damage if not noticed in time. For instance, where the furnace is set over a pit, the pit might fill up, shutting off the air supply to the furnace and causing the furnace to burn out in a short time, to say nothing about the lack of heat in the house and the danger of fire from the over-heated furnace.

In the usual type of automatic float valve, much trouble has also resulted from dirt clogging up the small valve opening.

It is evident now, with the increasing demand for proper humidification in the home, as well as in public buildings, that a more reliable automatic float valve will enjoy a wide sale. This will be particularly true if such a valve can be manufactured and marketed at a low cost.

This new automatic float valve, Patent No. 1,310,085, has all the necessary and desirable features, and its design approaches, as far as it is possible to go with a mechanical device, a "fool proof" instrument.

The needle valve A is made of German silver and it seats against brass. This avoids corrosion at this vital point. The valve opens by the float B dropping with the water and backing the needle A off its seat C by the rotation of the triple pitch screw on the needle stem. The height of the water can be varied by the rotation of the whole valve seat member C in its containing member D. This rotation of the valve seat is accomplished by unloading a set screw E and slipping the barrel out of its containing member D far enough so that the grooves are disengaged and it can be rotated. When this is at the correct position, it is slipped back into engagement with these grooves again and the set screw screwed down to hold it in place. Thus it is possible, by starting the triple thread on the needle at different positions, to set the seat in different rotative positions and thus equalize wear on the vital parts.

The float B is connected to the needle by a lost motion device F which allows the water to fall slightly without motion of the needle. Then when the lost motion device F takes hold and turns the needle back off its seat, the water pressure will back it all the way off to the limit of the lost motion device. This causes a rush of water through the valve opening that cleans out the dirt that may be lodged there, and this operation reduces the wear as the valve does not operate continually by being cracked open.

The valve bracket G is made with an adjustable clamp that can grasp the edge of any container which is to be kept full of water. The connection from the water supply line to the float valve is made by a flexible hollow copper wire H of $\frac{1}{8}$ inch or $\frac{3}{16}$ inch outside diameter. An ordinary valve I is used at the water supply line so that the float valve can be turned off at any time. The flexible connection to the tank in the furnace makes it possible to remove the whole valve from its tank by unloosening the two set screws on the bracket G. This feature facilitates installation, inspection, and repairs.

This valve is now being used on some humidifying tests in connection with warm air furnace heating, at the University of Illinois. The work is being carried on under the head of Warm Air Furnace Research, and is being partly financed under a cooperative agreement with the University, by the National Warm Air Heating and Ventilating Association. The float valve was tried out for reliability, in the laboratory, before the tests were started. The amount of water it handled under 40 pounds pressure and through about 8 feet of $\frac{1}{8}$ inch wire, varied from 75 to 200 gallons of water in 24 hours. The lowest figure represents the amount of water handled when

the float had dropped but $\frac{3}{4}$ inch. The larger figure represents the amount of water when the float was down as far as it could go.

A rather crude model of this valve was in service two years, without once failing to operate, before it was perfected and patented. A few valves have been made recently for experimental purposes. It is not yet on the market as the patent rights are for sale. If the patent rights are not sold, a company will probably be formed to manufacture and market them on a large scale. The market is very large for a good valve of this kind, as it can be sold at a relatively small cost, and can be quickly and easily installed in any water pan in any furnace. Furnace manufacturers are soon to equip their products with proper humidifying devices and they will be large consumers of a reliable automatic float valve.

The valve is readily adaptable to many other uses than that of humidification in connection with warm air furnaces. Any communication in regard to this valve should be addressed to Ward E. Pratt, 104 M. E. Laboratory, University of Illinois, Urbana, Illinois.

MOVES TO NEW FACTORY BUILDINGS RECENTLY CONSTRUCTED DUE TO GROWTH OF BUSINESS.

The Hart and Cooley Company, Incorporated, recently situated in the plant of the Fafnir Bearing Company, New Britain, Connecticut, have moved to newly constructed factory buildings in that city. Three of the new buildings are completed; two are in the course of construction. Two of the completed plants are each 75 feet wide by 500 feet long and two stories high. One of the new factories is 75 feet by 300 feet, two stories high; and all are constructed entirely of brick and iron. A power plant 75 feet by 50 feet is built alongside of a railroad siding connecting the new factory with the New Haven Railroad. The traction system which extends throughout New England also has an extension running by the new buildings of the Hart and Cooley Company.

The new buildings are of the latest architecture. They are well lighted. Labor saving machinery is installed wherever possible. As a matter of fact, in the new factory, the Hart and Cooley Company can justly claim to be able to manufacture goods more cheaply than hitherto, due to its modern and progressive productive facilities. Through all the stages of manufacture, the goods produced by this company will be made by machinery of the latest type. Warm air registers, ventilators, ceiling plates, and similar products are manufactured by the Hart and Cooley Company.

Seventy-five by one hundred feet of its new ground is devoted to offices. Like the factory, the offices are equipped for efficient transaction of all business which may be sent to them. The factory is a composite unit in accordance with the demands of the times — increased production.

In its new home the Hart and Cooley Company announces that it will be able satisfactorily to handle the vast amount of increased business which has kept

the Company always on the alert, constantly forcing it to enlarge its productive capacity. The growth of the warm air heating industry as a whole is reflected in the expansion of this Company. With the demand for more warm air heaters, naturally, followed the need for registers, ventilators, ceiling plates, etc. And judging by the rapid growth of the Hart and Cooley Company, its products have met with satisfaction throughout the entire country.

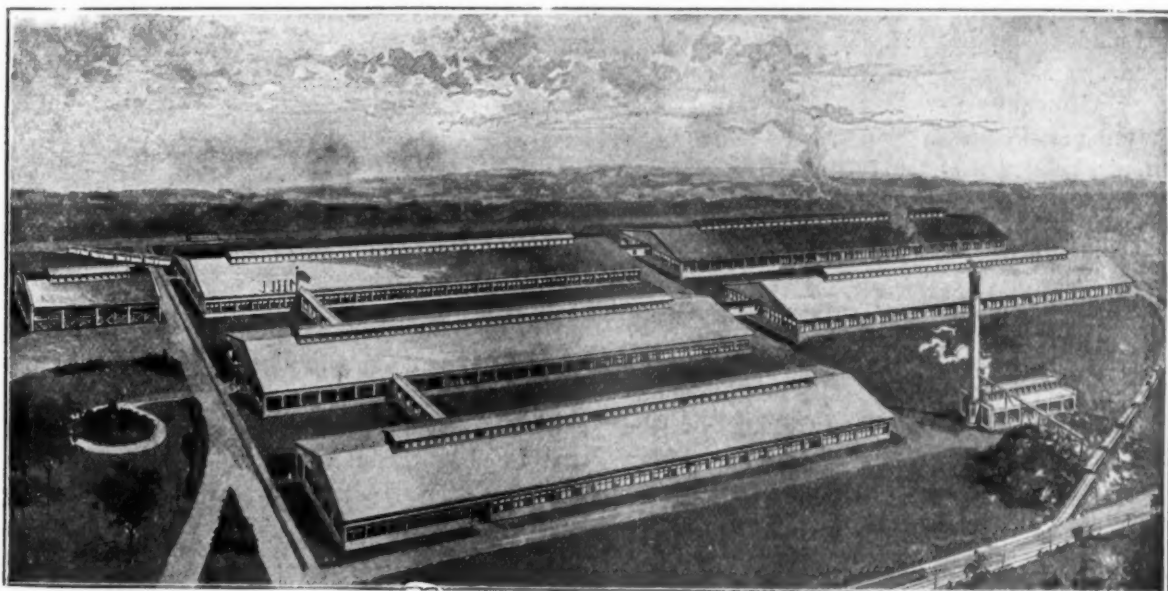
The original factory of this Company back in the year 1901 was a small three-story building. At the very start it was made a principle of this concern to employ only the most efficient means of production available. Hence its steady progress. Soon the business requirements outstripped the possibilities of the small plant. The Company moved to larger quarters. The indications are that, even though it has reached a high state of development, it will not be satisfied with the new equipment. Each new demand put upon

GETS CONFIDENCE OF CUSTOMERS.

Take a personal interest in the uses to which your customers are going to put the goods you sell them. By your experience you are in a position to aid them. This gains their confidence. As a forerunner to future business you can possess nothing better than the confidence of your present customers. Take a personal interest in what becomes of your goods after they leave your store.

GIVES IT ATTRACTIVE APPEARANCE.

Most advertising is overcrowded. What is the result? The reader will not pause to disentangle the mess. Thus, the advertisement is of little avail. A carefully balanced advertising copy is as essential as the subject matter contained. The most important part of the announcement should be placed at the top



New Plant of the Hart and Cooley Company, Incorporated, New Britain, Connecticut.

its productive capacity by the augmenting of the warm air heater business will be met with its usual vigor and responsiveness. Only lately an example of the enterprise of the Hart and Cooley Company in keeping pace with the broadening needs of retailers and installers was shown in the production of its new pedestal registers. The expansion of the warm air heater business invoked new demands in the way of registers, etc. These demands had to be supplied. Being new, the requirements were a deviation from the usual line of register manufacture. This was no obstacle to the Hart and Cooley Company.

To its past and prospective customers the Hart and Cooley sends the word that it is prepared to supply them with the facility that has marked its method of doing business in the past.

From the point of view of the general industrial situation the increasing of the productive capacity of this company only adds to the growing list of instances of the trend toward the activities which make for universal prosperity. Not only does this growth show an advancement in the warm air heater business, but it portrays the steady and rapid broadening of the industrial superiority of the United States.

in large type with plenty of white space around it. Following, in proper order, should be arranged the detailed matter with the important items outstanding in bold type. A well arranged advertisement will stand out and gain attention above all others on that page.

IS BECOMING UNIVERSAL TONGUE.

The English language is becoming the world tongue. Clemenceau, Premier of France, when asked what was the official language spoken at the Peace Table answered, "It is no fault of mine that two-thirds of the world is under English domination." With the advent of America as a factor in world commerce a new impetus is added to the ever-spreading use of the English language.

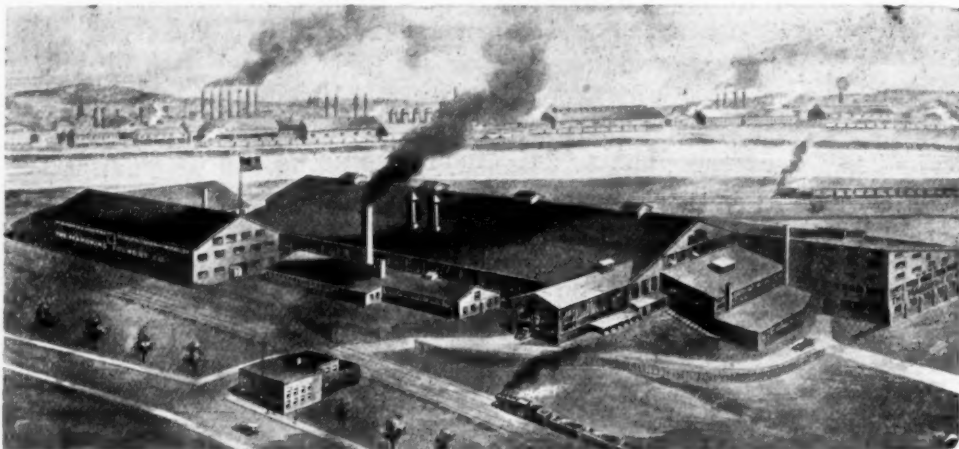
Dare to enter new fields. Don't wait for a precedent. Don't wait for your neighbor to set a mark and then follow in his trail. You make the mark and let others follow. Be a propelling force in your community. Set enviable goals in your line of business or trade.

INCREASES ITS PLANT CAPACITY AS A RESULT OF EIGHTEEN YEARS OF SUCCESSFUL MANUFACTURE.

Eighteen years ago The Mahoning Foundry Company was organized on a small scale by men of recognized ability and standing in the industrial life of Youngstown, Ohio, in the old Morrison Brass Foundry Building on North Avenue of that city. The officials of this company are: Grant S. Jones, President, J. W. Wright, Vice-President, J. W. Long, Manager, Fred. C. Noll, Secretary-Treasurer. All are men with mature knowledge of the warm air heating industry, and of the best business practices. An impetus to their business caused them subsequently to move to a larger factory site on Poland Avenue, Youngstown, Ohio. In a small foundry building on this site The Mahoning Foundry Company engaged in the manufacture of warm air heaters and foundry products. The business soon outgrew the capacity of its plant. A mammoth plant was erected bordering the Youngstown and Suburban Railroad at Kyles Corners. The new plant is a model of modern productive attainment. The same thoughtful care which characterized the design of the Mahoning products was displayed in the design of the new plant at Kyles Corners. A large tract of land here with special formation admirably

From the cupola spout, the molten metal is conveyed to the molding floors by monorail system, cranes and other up-to-date conveying machinery. Every mold is provided with a crane for handling all his equipment. The latest design of core oven with mechanical devices for handling the cores is another feature. A thoroughly equipped woodworking shop, metal pattern making department, air compressor with latest compressed air devices and molding machines, wash and locker rooms are incidentals to this modern factory.

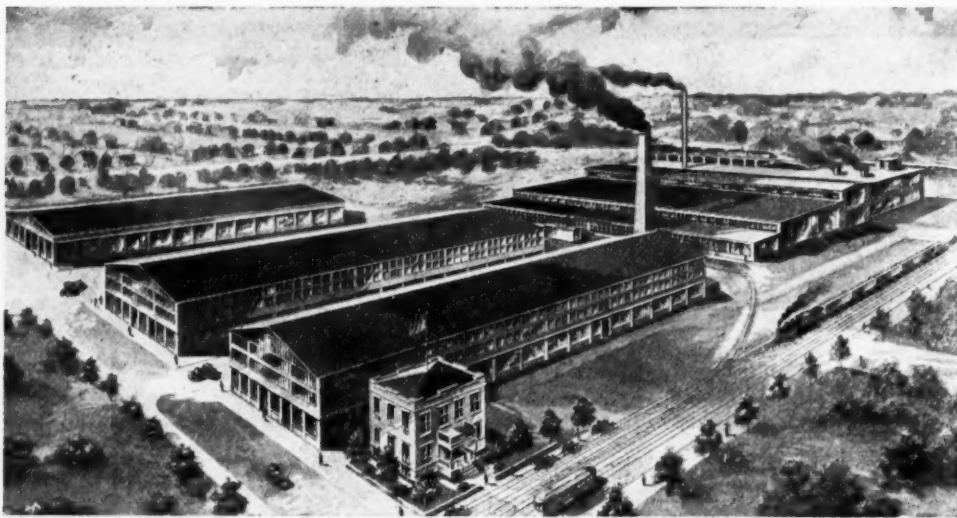
From the molding floor, the castings are successively passed through the cleaning and polishing room,



The Mahoning Foundry Company Site on Poland Avenue, Youngstown, Ohio.

mounting and fitting room, on through the sheet metal department for the addition of the sheet metal parts until they reach the warehouse fully equipped for shipment. By means of raised trestles, all coke and coal for heating boilers is dropped from bottom of the products manufactured by them. This company's practical experience in installing warm air

heaters in Youngstown, Ohio, and vicinity—which is large and extensive—is afforded retailers through the bulletins and catalogues published by the Mahoning Foundry Company from time to time. An interesting document pertaining to installation of warm air heater is their bulletin No. 63, "Instructions For the Installation of Wright Pipeless Heaters." This folder contains concise and accurate information on the installation of pipeless warm air heaters. Should



New Plant of The Mahoning Foundry Company, Kyles Corners, Youngstown, Ohio.

adapted to the purposes of the new plant, afforded opportunities for some unique arrangements and labor saving features. Owing to the contour of the ground, a switch was inclined to the level of the cupola charging platform, permitting the unloading of the raw pig iron and coke directly from the freight cars to the cupola charging door, entirely eliminating the necessity of elevating this stock as is always done in other foundry operations.

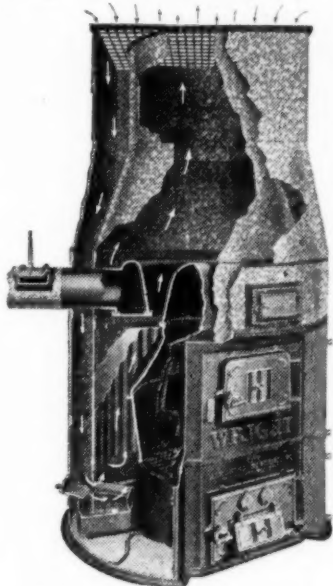
the installation of a pipeless heater be of any special character or should the directions given not be entirely clear, declares The Mahoning Foundry Company, they will gladly furnish any additional information or advice which may be needed properly to install their products. It is the claim of this company that this service, combined with their constant aim to better their product and to serve their customers in the best available manner has enabled them to increase their

productive capacity. Throughout the entire eighteen years of its existence, states this company, it has worked on the principle that the dealer is a portion of its establishment and must take part in the benefits derived from an enlargement in its plant. That the Mahoning Foundry Company has not operated under an erroneous unloading.

The Mahoning Foundry Company maintains a large sheet metal department. A big force of efficient tanners is employed for the installation of warm air heaters in Youngstown, Ohio, and the vicinity within trucking distance.

To dealers outside trucking distance the Mahoning Foundry Company gives substantial advice on the installation of their warm air heaters. They have made it a practice to issue various bulletins containing definite and practical instructions for the installation of business relations concerning dealers is proved by its continuous ratio of development.

The seventeen years of experience in the warm air heater business of this company appreciably reflects itself in their products. Dealers in all parts of the country handle Mahoning Warm Air Heaters. An excellent pipeless heater is made by The Mahoning Foundry Company. Illustrated herewith is the Wright Pipeless Warm Air Heater, manufactured by the Mahoning Foundry Company. Many good features are embodied in this product. A specially designed vapor pan is installed in the Wright Pipeless Warm Air Heater. To gain the highest utility, this pan is placed at a point



Wright Pipeless Warm Air Heater, Made by the Mahoning Foundry Company, Youngstown, Ohio.

where the greatest amount of water will be most effectively evaporated. Many physicians emphasize the benefits of adequate humidity of warmed air. Some claim that this is one of the most important attributes of warm air heaters and should, therefore, be given the consideration it merits. The water pan in the Wright Pipeless Warm Air Heater is placed just underneath the inner jacket, so that the circulating air passes down and directly over the entire surface of the water. The moisture is thus carried up the inner jacket and thence distributed into the rooms heated. A heavy triangular revolving grate which presents a maximum amount of opening for passage of air to feed the fire, is part of the Wright Pipeless Warm Air Heater, declare the manufacturers.

The cup joints are extra large on all castings and there is a roomy ash door opening so that the grate can be removed through the ash door without disturbing the

heater. Other details of equal interest are to be found in the catalogue describing the Wright Pipeless Warm Air Heater, which can be had on application to The Mahoning Foundry Company, Youngstown, Ohio.

SALESMEN'S OPPORTUNITIES HAVE BEEN GREATLY INCREASED.

A new order of things in selling and selling methods is here as a vital element in the war's aftermath.

Vast opportunities, growing out of post-war conditions, open before the salesman today, according to DuPont Magazine.

Many factors have combined to bring about this most interesting situation. New projects, held in abeyance during the war, are now being pushed, thus opening new sales fields of unknown extent. Deferred demand, which could not be met while war requirements held precedence, is now maturing. Expansion and development, dictated by progressive business policy, are the order of the day, and business organizations everywhere are branching out into new fields, thus enabling their salesmen to broaden their activities.

Opportunity, facilities and territory, alone, however, do not make the salesman's success. His achievement in selling is in exact proportion to his energy and intelligence in coordinating his sales effort with the extent, character and possibilities of his field. In selling, more than in any other line of work, success is "up to" the man himself.

The salesman who gets ahead is always on the alert for mental and personal improvement. He realizes that he can never know too much about his profession and about affairs in general. He is constantly extending his knowledge of business and business procedure and watching the trend of events. He studies his products and their applicability to other than the accepted uses. He avails himself of every opportunity to become conversant with markets and market conditions by surveys and investigations. Thus he becomes more capable and more flexible as a salesman and more readily adaptable to varying conditions of trade and method.

More particularly, he studies his territory and its possibilities for the goods he is selling. He analyzes the local conditions and plans his campaign accordingly. He is not content simply to put his goods on the dealer's shelves and then leave the merchant to move the stock as best he can. He is alive to the fact that the greatest success comes to him who renders the greatest service. So he serves his own best interests by assisting the dealer, definitely and tangibly, to "put across" the products. This assistance is, of course, based upon his study of the purchasing power of the community for his goods.

He becomes, as it were, the merchant's ally. He gives the dealer the benefit of his honest judgment, and is just as alert against overselling his trade as he is against underselling. Soon the dealers on whom he calls begin to feel that here is a man whose advice may be depended upon, and their good will becomes his in constantly increasing measure.

PRACTICAL HELPS FOR THE TINSMITH

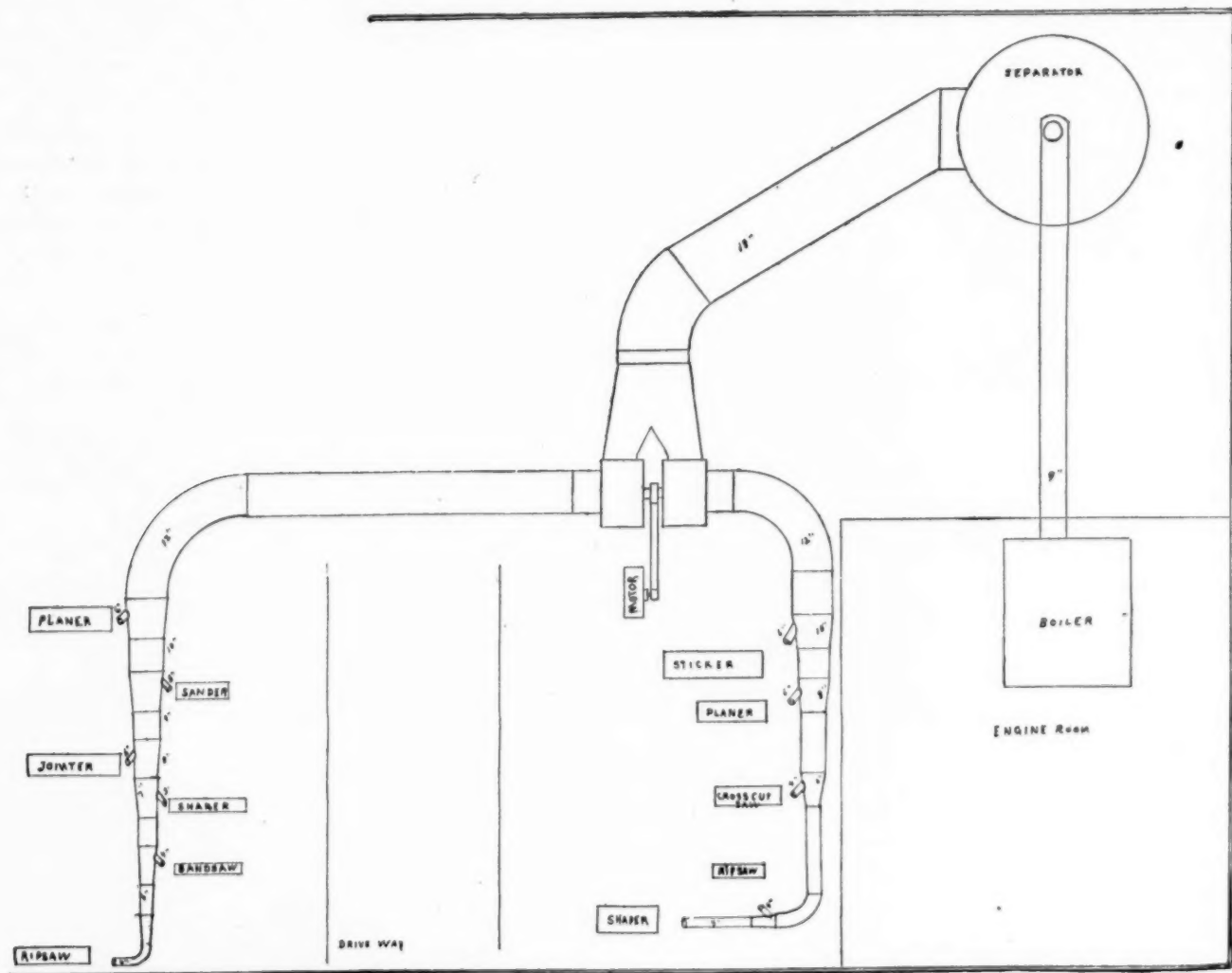
PLANING MILL.

By O. W. KOTHE.

The plan we here show as taken from a job in Canada, does not set out well. Machines are placed very close together and this causes congestion among

The fans should always be placed nearest the machines doing the heaviest work. In this way the great volume of material from the heavy machines will have the fullest suction and least distance to travel.

The selection of fan is best determined by combining the areas for all branch pipes, which gives the



Plan of Planing Mill Job.

the workers. Of course, the piping is placed wherever the machines are. In this case we have two planers, one sticker machine, one jointer, two rip-saws, two shapers, cross-cut saw, and sander machine.

A double fan is used; and while it is properly branched off, it does not run into the separator properly. The workman runs the discharge pipe in the center of shell, when in reality it should have been run in tangent with the cylinder of shell. The reason for this is so that the air forces the material to whirl along the inside surface of separator. This whirling takes on the shape of a spiral as the air escapes, the material being heavier it gradually drops while still circulating along the surface until it passes off through the outlet.

inlet for fan opening. Fan catalogues give charts for all the remaining data. Different types of fans produce different results, and for this result, we must look up what the manufacturer specifies it can do.

Workmen interested in fans should supply themselves with catalogues from fan manufacturers and study them carefully.

POSTPONES MEETING OF CHICAGO SHEET METAL CONTRACTORS.

Owing to the fact that a number of the members were called away on business to Washington, D. C., the meeting of the Chicago Sheet Metal Contractors' Association which was to have been held December 2,

1919, has been postponed to Tuesday, December 9, 1919. The program which was announced for that meeting will be carried out at the next meeting Tuesday, December 9, 1919, which is to take place at 6:30 p. m., Hotel Morrison, Madison and Dearborn Streets, Chicago, Illinois. Harry C. Knisely, President of the Association, announces that in addition to an address by Arthur P. Lamneck, President National Association of Sheet Metal Contractors, interesting talks will be made by George Harms, Ex-President of the National Association of Sheet Metal Contractors; Rudolph Jobst, President Illinois Association of Sheet Metal Contractors, and J. W. Lewis, all of Peoria, Illinois.

NATIONAL ASSOCIATION OF SHEET METAL CONTRACTORS WILL HOLD CONVENTION IN JUNE.

Comprehensive plans are in course of formation for the next annual convention of the National Association of Sheet Metal Contractors. It will be held in Peoria, Illinois, June 9, 10, and 11, 1920. The Peoria Local of the National body, believing strongly in preparedness, has already begun arrangements for taking care of the largest attendance in the history of the organization. Every effort will be made to promote the comfort and convenience of the delegates to the convention. Hotel accommodations will be reserved sufficiently far in advance of the dates of the annual meeting to insure pleasant lodgings for every one in attendance.

Arthur P. Lamneck, of Columbus, Ohio, President of the National Association of Sheet Metal Contractors, is planning to hold several conferences with the National Secretary, Edwin L. Seabrook, of Philadelphia, Pennsylvania, so that every possible contingency may be studied and provided for in the smooth working of the sessions of the forthcoming convention. Other officers of the Association are giving their best thought to the matters which will be discussed at the June meeting. The rank and file of the Association are thoroughly awake to the necessity of co-operative study of the problems which are pressing for solution in the sheet metal trade. It is expected that the convention will crystallize the sentiment of the trade of many important points.

THE SHEET METAL CONTRACTORS OF MILWAUKEE HOLD MEETING.

The largest attendance of the year marked the December meeting of the Master Sheet Metal Contractors' Association of Milwaukee, Wisconsin, which was held December 3, 1919, at 8 p. m., at Builders' and Traders' Exchange in that city. Communications were read from the National Secretary, the St. Louis local, the Catalogue Company, the Builders' and Traders' Exchange who wrote relative to the licensing of contractors, also a report of the Apprenticeship Committee all of which were ordered placed on file to be taken up in the regular order of business.

The letter of the Catalogue Company was taken up and members agreed not to take space on architects'

specification covers. Paul L. Biersach reported that the licensing of contractors in the city has got as far as the judiciary committee of the Common Council who intend to report favorably on its passage. A committee consisting of Paul L. Biersach, Joseph M. Hollitz, and William F. Gallum were appointed by the chair. A motion was passed to favor the licensing of contractors. President Romberger reported that another meeting had been held with Mr. Scrimshaw of the Industrial Committee, and that a wage scale for the Apprentices had been agreed upon by which the apprentice would work forty-four hours a week, eight of which would be spent at school and would receive at the rate of 25 cents an hour for the forty-four hours and an increase of 2½ cents for each six months in the service for four years until the last half year when the increase would be .05 cents. A bonus of \$100 would be paid the apprentice at the completion of his term for four years.

Thereupon the president ordered nominations to be placed for the officers for the election to be held on January 7, 1920, which resulted as follows:

President: WILLIAM HAMMAN, O. A. HOFFMAN;
Vice-president: HENRY PLUCKHAN, JOHN GRAF, WILLIAM GALLUM and AUGUST KLUBERTANZ;
Secretary: EDWARD HOFFMANN;
Treasurer: JOSEPH HOLLITZ;
Sergeant at Arms: A. J. SCHUMANN, J. RAASCHKA;
Three members on the Executive Committee: J. BARTELSON, ALFERD GOETHEL, JACK MILLEN, AUGUST GRAUNKE, P. JESKE.

The entertainment committee reported that they would have a good lunch for the members on election night.

UNIVERSITY OF MINNESOTA OPENS A VOCATIONAL TRAINING COURSE.

A newly organized Department of Trades and Industries has been opened in the College of Education, University of Minnesota, Minneapolis, Minnesota. At the head of this new department is Professor Arthur F. Payne. The judicious work of Professor Payne has gained him recognition as a teacher of practical and industrial subjects. He was formerly with the Bradley Polytechnic Institute, Peoria, Illinois, Pratt Institute, Brooklyn, New York, and last year director of Industrial Education at Johnstown, Pennsylvania.

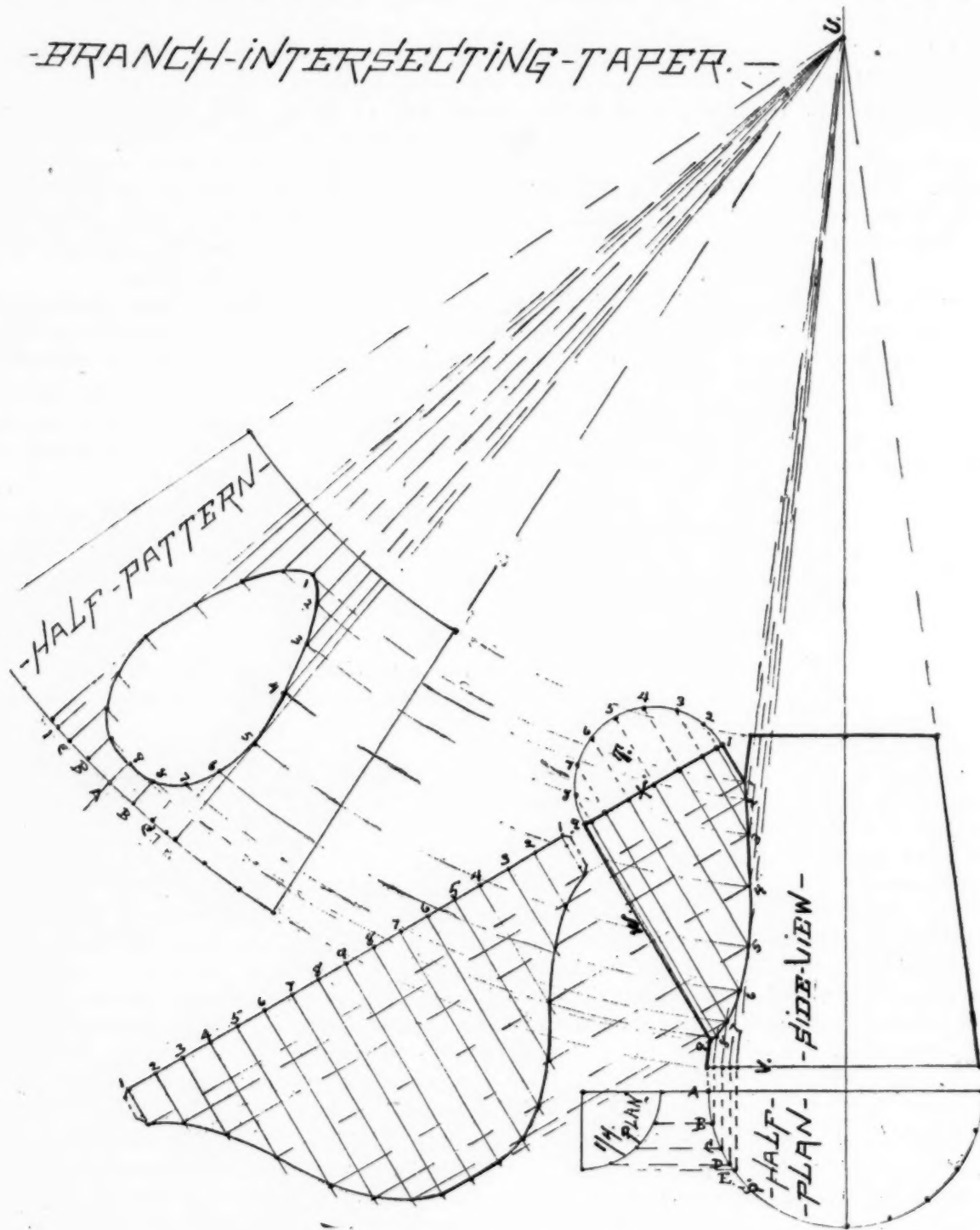
Under Professor Payne this new branch of the University is devoted to the preparation of directors, supervisors, and teachers of all branches of trade and industrial subjects. Requirements for entry are not the same as for regular college courses. Adults not candidates for a degree may enter the courses offered regardless of previous education. Prospective pupils must satisfy the dean that they are able to pursue the course with profit. Extension courses on the trades and industries are also conducted by the University. Detailed information concerning particulars in connection with the new branch of study under the direction of Professor Payne may be obtained by addressing the Director of the University Extension, University of Minnesota, Minneapolis, Minnesota.

PATTERN FOR A STRAIGHT BRANCH INTERSECTING TAPER PIPE.

By G. L. GRAY.

This problem is most frequently used in ventilation and indirect heating. The branches should intersect the tapers as near large end as possible at 30 degree angle and never more than 45 degrees.

points A to E on half plan S intersecting line V, and from these points draw lines to radius point U. Place T square parallel with line W. Draw lines from all points on line X intersecting corresponding lines drawn from radius point. A line drawn through these intersecting points will give the miter line of straight pipe intersecting taper. Draw stretchout line placing T square parallel with line X; draw lines from all



Straight Branch Intersecting Taper Pipe at an Angle on Center.

First draw half plan of large end of taper, then a $\frac{1}{4}$ plan of straight branch, and space it into a convenient number of equal spaces. Place T square parallel with line A. Draw lines from all points in $\frac{1}{4}$ plan intersecting half plan of large end S. From half plan draw a side view showing straight branch intersecting taper at required angle. Draw a half plan T and space it into same spaces as $\frac{1}{4}$ plan. Place T square at right angles to line A; draw lines from all

points on miter line intersecting corresponding lines in stretchout. A line drawn through these intersecting points will give the required pattern for pattern of hole. Take spaces A to E of half plan and place them as shown, and draw lines to radius point U.

Rolling stones plunge in where angels fear to tread, but listen, Claude, it's getting there that really counts in this old world."

NOMINATES ITS OFFICERS FOR 1920.

At the November meeting of the Roofing, Metal and Heating Engineers of Philadelphia, Pennsylvania, officers for 1920 were nominated. They are as follows:

President: WILLIAM E. HOPKIN.

Vice-President: M. J. LENIHAN.

Treasurer: OLIVER BARTHOLOMEW.

Directors to serve for two years were nominated as follows:

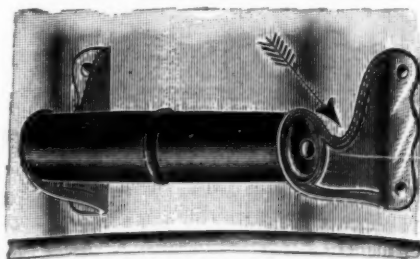
JOSEPH V. KELLEY,
CHARLES F. GEISSLER,
JAMES G. ROBERTSON,
EDWIN P. BENNETT,
EMIL KNODEL.

With no little visible and appreciated effect on the general welfare of The Roofing, Metal and Heating Engineers of Philadelphia, Charles F. Geissler, the retiring president, has served for twelve consecutive years. His service marks an historic period in this organization.

Elections will be held at the December meeting. This meeting is scheduled to be conducted at the New Bingham Hotel, Philadelphia, Pennsylvania. In connection with the election a "quarterly dinner" will be given. At this meeting an opportunity will be afforded the members of The Roofing, Metal and Heating Engineers to exchange their views on the trade for the benefit of all concerned, and to assert their good fellowship.

HANDLE UPHOLDS LARGE WEIGHTS.

A boiler handle made to hold up under unusual weights is depicted herewith. The Keystone Boiler Handle Number 40, manufactured by the Berger Brothers Company, Philadelphia, Pennsylvania, is sturdy through-



Keystone Boiler Handle Number 40, Made by the Berger Brothers Company, Philadelphia, Pennsylvania.

out. The clips of this handle are made of heavy sheet steel. The metal is brightly tinned and presents a finely finished appearance. They are cupped for shoulder with wood and have countersunk holes so that when the heavy rivets are upset and drawn tight, the wood can never get loose. It is claimed that they will outlast any boiler, no matter how good.

The Berger Brothers Company also manufactures a complete and standard line of tinnery and roofers' supplies. A great number of satisfied users of their products in all parts of the country highly recommend their goods. Their stock is always large and complete. It is said they ship promptly upon receipt of order. Among others things this company manufactures: Gutter hangers, conductor hooks, valves, plungers, snow shoe irons, boat pumps, ears, etc. A catalogue published by them depicts the interesting line of products manufactured. Sheet metal contractors and others requir-

ing this catalogue or detailed information concerning the line of goods outlined above, should write to the Berger Brothers Company, 229-231 Arch Street, Philadelphia, Pennsylvania. Prompt reply to communication is assured.

ASSURES SATISFACTORY RESULTS.

Satisfactory results, declare I. Lippa and Company, Chicago, Illinois, manufacturers of "Ilco" Brand Solder, illustrated herewith, are guaranteed when their products are used. In all work, no matter how exacting, in which a perfect solder is required, their



"Ilco" Brake Solder, Made by I. Lippa and Company, Chicago, Illinois.

brand of metal is said to give good results. Only pure ingredients, properly proportioned by skilled workmen, and perfect alloys are used in the manufacture of "Ilco" Brand products, state the makers. Besides the product depicted herewith, this company manufactures Babbitt, Yankee pig lead, etc. A trial order sent to I. Lippa and Company, 2433-41 West 48th Street, Chicago, Illinois, will enable the Company to offer proof of its claims.

CHEERFULNESS IS MAGNETIC FORCE.

Cheerfulness is a magnetic force which brings back to its source all who have once been within its radiant glow. Business is a sober undertaking, but cheerfulness is an indispensable appendage of it. Cheerfulness is not sold but is given away with all sales—at least it should be. It does not require effort, and it pays.

MAKES RELIABLE POLYGON ELBOW.

The Ferdinand Dieckmann Company, Cincinnati, Ohio, are the manufacturers of the Polygon Expanding Elbow illustrated herewith. They state that by



"Dieckmann" Polygon Expanding Elbow, Made by The Ferdinand Dieckmann Company, Cincinnati, Ohio.

using a polygon elbow, polygon pipe can be put up as readily as plain round pipe. These elbows are manufactured with precision. They can be furnished in any of the following materials: Galvanized and Terne steel, galvanized and Terne charcoal iron, bright coke plate ingot iron, 12-14-16 ounce copper, Toncan Metal, and Newport G. O. H. iron. In sizes from 2 inches to 6 inches, Dieckmann elbows can be furnished in any desired angle. All elbows manufactured by this company are made in one

piece and have no seams. The crimps are on the body of the elbow, leaving back and inside perfectly smooth. The manufacturers declare that this is an advantage which will be recognized by sheet metal contractors as greatly aiding in performing a more satisfactory job. The ends of all elbows are securely fastened with Dieckmann's patented clinch and are gaged to fit standard diameters of conductor pipe. No clipping is required to make them fit. To hold them in position, no solder need be used. Where elbows are made of special material the name of the metal used is stamped on it. For catalogue depicting complete line of Dieckmann elbows and shoes and for information regarding details such as price, shipments, etc., address The Ferdinand Dieckmann Company, P. O. Station "B," Cincinnati, Ohio.

GET EXPERT ADVICE WHEN PUZZLED.

When a technical problem presents itself that is beyond solution, get the advice of an expert. There are many sources of information. Don't bungle the job. Make sure. Though there is no stitching in the tinning or hardware line, we still can say with assurance of application, "A stitch in time saves nine."

IS SHORT, QUICK SPEECH TO LARGE AUDIENCE OF PURCHASERS.

In writing advertising copy imagine yourself in front of a large audience—the prospective readers of your advertisements. Further imagine—as is the case—the audience is in a hurry; so are you. You want to say as much as you can. You want them to remember as much as they can. Your message must be interesting, direct. The picture you see is exactly the position you are in when you write copy. Write it accordingly.

NOTES AND QUERIES.

"Reliable" Stoves and Ranges.

From C. R. Oberholtzer, 509 West Maumee Street, Angola, Indiana.

Can you tell me the name and address of the manufacturer of the Reliable stoves and ranges?

Ans.—The Reliable Stove Company, Division American Stove Company, Cleveland, Ohio.

Machines for Corrugating Galvanized Iron.

From The Star Boiler and Can Company, 2661 East 37th Street, Cleveland, Ohio.

Where can we buy machines for corrugating galvanized iron?

Ans.—Berger Brothers Company, Philadelphia, Pennsylvania; Bertsch and Company, Cambridge City, Indiana; Friedley-Voshardt Company, 733 South Halsted Street, Chicago, Illinois; Merchant and Evans Company, 347 North Sheldon Street, Chicago, Illinois; Niagara Machine and Tool Works, Buffalo, New York; F. J. Knoedler, 68 North 2nd Street, Philadelphia, Pennsylvania; Hemp and Company, St. Louis, Missouri.

Glass Eyes for Owl Andiron.

From Oakland Foundry Company, Belleville, Illinois.

Kindly give us the name of a manufacturer of glass eyes for our Owl Andiron.

Ans.—H. Golden Company, 115 South Dearborn Street, Chicago, Illinois.

Rebuilt Adding Machine.

From Charles Shore, Shannon, Illinois.

Please inform me where I can purchase a rebuilt adding machine.

Ans.—Burroughs Adding Machine Company, 140 South Dearborn Street, Chicago, Illinois, and the Adding Machine Corporation, 323 South La Salle Street, Chicago, Illinois.

Repairs for Greens Colonial Warm Air Heater.

From Olivier and Uleberg, Dolloff Building, Minot, North Dakota.

We would like to know who manufactures Green's Colonial Warm Air Heater No. 634.

Ans.—Green Foundry and Furnace Works, Des Moines, Iowa.

Thor and A. B. C. Electric Washing Machine.

From Keleher and Breit, Lodi, Wisconsin.

1. Kindly advise who makes the Thor electric washing machine. 2. Also who manufactures the A. B. C. electric washing machine.

Ans.—The Hurley Machine Company, West 22d and South 54th Avenue, Chicago, Illinois, make the Thor electric washing machine. 2. Altofer Brothers Company, Peoria, Illinois, manufacture the A. B. C. electric washing machine.

From a subscriber.

Wants Number of Addresses.

1. Can you give me names of concerns making steam tables? 2. Also who makes coffee urns. 3. Would also like to know who manufactures dish washing machines.

Ans.—1. Born Steel Range Company, 3945 West 25th Street, Cleveland, Ohio; Montague Range and Furnace Company, 826 Mission, San Francisco, California; Albert Pick and Company, 212 West Randolph Street, Chicago, Illinois, Stearns Company, 215 North Michigan Avenue, Chicago, Illinois, W. F. Traub, 912 Montrose Avenue, Chicago, Illinois; John Van Range Company, 5th and Broadway, Cincinnati, Ohio, and Wrought Iron Range Company, 5661 Natural Bridge Avenue, St. Louis, Missouri, make steam tables. 2. American Electrical Heater Company, Detroit, Michigan; Lalanc and Grosjean Manufacturing Company, 1900 South Clark Street, Chicago, Illinois; Albert Pick and Company, 212 West Randolph Street, Chicago, Illinois; Stearns Company, 215 North Michigan Avenue, Chicago, Illinois; Born Steel Range Company, Cleveland, Ohio, and John Van Range Company, Cincinnati, Ohio, make coffee urns. 3. You may obtain dish washing machines from the following: G. S. Blakeslee and Company, 2856 Quinn Street, Chicago, Illinois; Crystal Washing Machine Company, 18 Piquette Street, Detroit, Michigan; Dunn Manufacturing Company, 180 North Dearborn Street, Chicago, Illinois, and the Wrought Iron Range Company, 5661 Natural Bridge Avenue, St. Louis, Missouri.

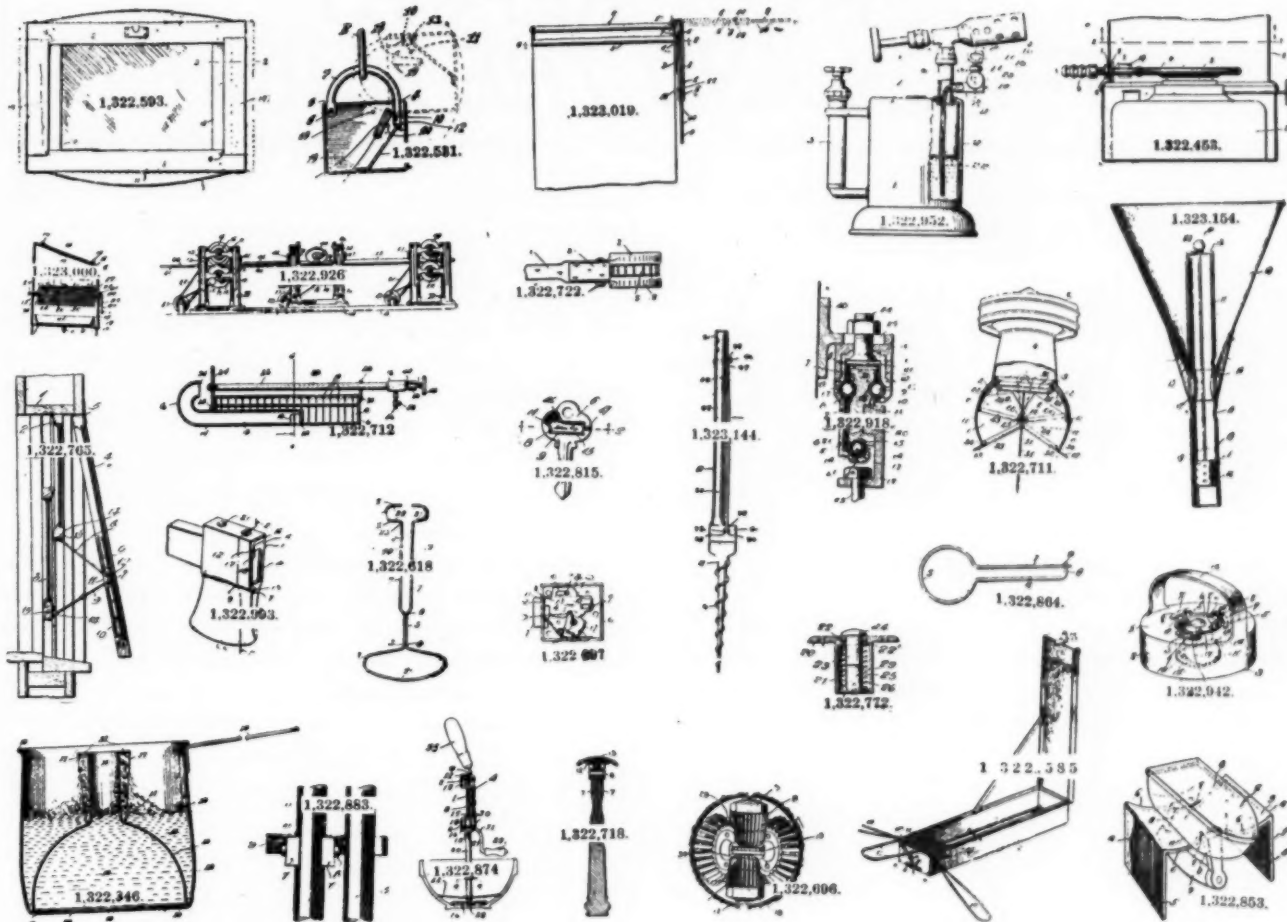
Aluminum Ware.

From the Standard Plumbing and Heating Company, Greybull, Wyoming.

Kindly tell me who makes aluminum ware of all descriptions.

Ans.—Atlantic Stamping Company, Rochester, New York; Cleveland Metal Products Company, Cleveland, Ohio; Massillon Aluminum Company, Massillon, Ohio, and the Monarch Aluminum Ware Company, Cleveland, Ohio.

NEW PATENTS.



1,322,453. Gas Attachment for Oil Stoves. Ernest V. Jungk, Brooklyn, New York. Filed November 5, 1918.

1,322,531. Padlock. Stephen G. Calvelage, Jamestown, North Dakota. Filed December 20, 1918.

1,322,585. Foldable Portable Clothes Hanger. Frederick L. Krohe, Wheeling, West Virginia. Filed March 28, 1919.

1,322,593. Window Screen. William Mansfield, Ash-
ville, Pennsylvania. Filed February 5, 1919.

1,322,618. Handle for Tools and Implements. William E. Richards, Hohokus, New Jersey. Filed April 9, 1917.

1,322,696. Rotary Boring Drill. Howard R. Hughes,
Houston, Texas. Filed October 29, 1918.

1,322,697. Lock. Charles E. Johnson, New Britain, Connecticut, assignor to The American Hardware Corporation, New Britain, Connecticut, a corporation of Connecticut. Filed June 29, 1915.

1,322,711. Ventilator. Harvey F. Maranville, Akron, Ohio. Filed May 25, 1916.

1,322,712. Oil Burner. Abraham L. Marshall, Kansas City, Missouri. Filed January 20, 1919.

1,322,718. Razor. Charles D. Mosher, New York, N. Y.
Filed Oct. 7, 1916.

1,322,722. Wrench. Daniel E. Norris, Robinson, III., assignor of one-half to Frank H. Norris, Robinson, III. Filed March 31, 1919.

1,322,765. Storm-Window Operator. August W. Denow,
Oshkosh, Wis. Filed June 27, 1919.

1,322,772. Curtain-Fastener. George B. Elliott, Wil-
mington, N. C. Filed July 17, 1919.

1,322,815. Identifying Means for Night-Latch Keys.
John E. Patterson, Poughkeepsie, N. Y. Filed Feb. 10, 1919.

1,322,846. Milk-Boiler. Michael Vegh, Bridgeport, Conn.
Filed June 16, 1919.

1,322,853. Support for Flat-Irons. Katherine L. Welsh,
Omaha, Nebr. Filed Feb. 25, 1919.

1,322,864. Handling-Tool. Carl P. Backlund, St. Louis, Mo. Filed Jan. 15, 1918.

1,322,874. Cream and Egg Whipper. Eugene C. Brull,
Oak Park, Ill. Filed April 12, 1918.

1,322,883. Gate-Latch. Herbert H. Drew, Edgerton,
Wis. Filed Jan. 16, 1919.

1,322,918. Hanger. Ulysses G. McQueen, New York,
N. Y. Filed April 24, 1917.

1,322,926. Metal Bending Machine. Perce W. Miller,
McKeesport, Pa. Filed Nov. 23, 1916.

1,322,942. Doughnut and Cooky Cutter. Alta M. Peterson, Ocean Park, Wash. Filed May 28, 1919.

1,322,952. Torch. Victor J. Robin, Butte, Mont. Filed April 19, 1919.

1,322,993. Ax. Conrad Allen, Peck, Idaho. Filed April 12, 1919.

1,323,000. Combination Ash-Sifter and Coal-Bin. John Bizet, New York, N. Y. Filed March 7, 1917.

1,323,019. Can-Opener. Hezekiah H. Crawford, El Paso, Tex. Filed July 9, 1918.

1,323,144. Fencepost. Leo J. Alig, Springfield, Ohio.
Filed April 11, 1919.

1,323,154. Funnel. Arthur J. Clark, Bath, Mich. Filed Oct. 7, 1916.

ILLUSTRATES GOODS ADVERTISED.

A well-drawn illustration enables the reader to grasp an idea at a glance. However, an illustration having no direct bearing on the advertising copy serves only to confuse the reader. It is imperative that the illustration pertain to the goods advertised. In the use of such illustrations, great care must be used in preparing copy so that it does not abruptly lead off into something vastly different from the picture. A gradual transition from the thought conveyed by the picture to the idea of the goods advertised is desirable and effective.

WEEKLY REPORT OF TRADE AND THE MARKETS

STEEL SHORTAGE IS ACCENTUATED BY LACK OF FUEL SUPPLIES.

In the production of steel such big amounts of fuel are required every working day that any lessening of the supplies is bound to register itself in reduction of output. In many quarters the coal shortage is becoming a matter of serious concern. Outside factors play an important part in the distribution of steel. It is because of this fact that producers are careful about committing themselves for the coming year in view of the uncertain labor outlook.

The demand for plates from the shipyards is expanding and it is estimated that recent contracts let in the East will require a total of 200,000 tons of plates and shapes. Business in structural steel during the week shows a broader market in this description. In finished products, the market also is strong. Steel bars are meeting with active demand, and prices now are in the neighborhood of three cents, despite the nominal quotation of 2.35 cents maintained by the larger producers, who, however, are not in position to accept business at this figure.

None of the Pittsburgh mills is able to accept any new business in semi-finished steel in either billets or sheet bars, for supplies are scarce.

The automobile makers are short of steel, particularly sheets, and in many cases the car output has been curtailed because of this shortage. Naturally the automobile producers are making efforts to obtain supplies. In many cases premiums amounting to \$20 per ton have been paid for prompt delivery of sheets, and makers have sought supplies until the jobbers and warehouses have virtually no stocks left.

The great extent of drilling operations in the new oil fields has made for an unprecedented demand for oil pipe and other tubular products, and the leading producers, sold up for more than half a year ahead, are not in the market for more business.

STEEL.

The steel market continues in complete control of the sellers, for the extreme scarcity of supplies, coupled with the strong demand, has left buyers competing openly against one another for supplies, with the natural result, higher prices. The schedule of March is disregarded generally, although the leading producers are making every effort to hold prices down and are booking future business as low as possible.

But the large producers are wary about the future and are cautious about the possibility of overselling. This throws the burden of supplying the bulk of demand on other producers. Some of the smaller independents are selling for whatever the market will pay and in many instances the market is willing to pay substantial premiums to acquire stocks.

The probability of an early resumption of railroad buying along with the other channels of demand, complicate the situation, while the shortage of coal is a "last straw." The steel trade worried through its own strike without help and without noise, but with the railroads taking what coal they need, some of the smaller plants need fuel greatly, and face a dismal outlook unless the miners get back to work quickly.

COPPER.

The copper market last week was still under the influence of the adverse conditions caused by the failure of the Senate to ratify the peace treaty. This has indefinitely delayed the establishment of foreign credits, the basis for future European buying of raw materials, especially copper.

With a new low price for copper, domestic demand was only slow in developing, as consumers have lost faith in the stability of the price and are buying still in a routine way, expecting a further sagging tendency. In many instances the present selling price of copper is dangerously near the production price, and while in ordinary circumstances a further reduction would be considered impossible, the heavy accumulation of the metal since the signing of the armistice is seeking an outlet, and the low cost copper producers might still be able to make a small profit even at a lower price.

One of the prominent factors in the market at the moment is the large amount of copper being offered for sale by custom smelters, who are receiving comparatively large consignments from high-priced mines because of the relatively large proportion of silver in such ores, and in not a few instances, the silver recovered pays the cost of production and smelting. It is because of this fact, largely, that production is not being more generally decreased by the smaller companies who could not live ordinarily with copper selling below 21 cents per pound.

An additional reduction has taken place in the price of copper sheet in the Chicago market, the quotation now being 28½ cents per pound.

TIN.

The market for tin is still governed by cables from London and Singapore, the two centers of supply, and the rate of foreign exchange is influencing domestic trading. A steady rise in London tin options was counterbalanced with a fall in the exchange rate, which remained strongly in favor of American buyers. Spot tin is in more plentiful supply and offered in Straits at 54½ cents, while 99 per cent tin was quoted at 53¾ cents. For future shipments from the Straits the rate was 54¾ cents.

In the meanwhile there is a comparatively poor market in America owing to large dock stocks and

profit-taking sales on futures and prices continue largely a matter of negotiation.

LEAD.

In the market for lead an easier conditions is reported, production for the past month having proceeded at a fairly full rate, and the present supply of Missouri lead seems to be now ample, so that the outside market has retired closer to the level of the price of the principal interests. Demand for the past ten days has not been active, partly caused by the coal strike, but this also operates to limit sellers in engaging far ahead. On the whole, offerings in the West are considerably freer for early shipment.

A slight reduction has occurred in the Chicago market, American pig lead having fallen from \$7.45 to \$7.25 per hundred pounds and bar lead from \$7.95 to \$7.75 per hundred pounds.

SOLDER.

The quotations ruling the Chicago market for solder are as follows: Warranted, 50-50, per pound, 32.50 cents; Commercial, 45-55, per pound, 30 cents; Plumbers' per pound, 27.50 cents.

ZINC.

Reports from Joplin, Missouri, say that better prices for zinc ore were recorded during the last week. While some ore was purchased for \$45 a ton, basis 60 per cent metallic zinc, the greater part of the tonnage brought \$47.50, with the premium ores bringing \$48.50.

The market was not particularly strong, however, due to the unsettled conditions. Producers have no confidence that prices will be materially increased until some of the major problems in the industrial world are solved, and there is no immediate outlook for this. Several additional mines have been forced to close down on account of the coal strike and more will be affected in a short time unless relief comes. The Waco field is particularly hard hit, as there is no natural gas supply there and only one mining plant is electrically equipped.

TIN PLATES.

It is the consensus among the independent tin plate makers that they should book business in the same manner as the leading interest, not seeking the advances which they assert could readily be secured by accepting bids of some consumers. This may not be the attitude of every individual independent manufacturer, but it is beyond question the attitude of all the large makers and of the capacity generally.

Technically, the delivery period with this book opening is the first quarter of next year for jobbers and the first half for large manufacturing consumers, including the makers of packers' cans. Practically, however, many of the mills will have a carry-over equal to about the production in the first three months of the new year. If everything works well the period may be a trifle less, while there is a possibility of its being longer.

There is a heavy demand for tin plate and the business is being done by allotments. These allotments

are being made somewhat slowly as the producers need to be conservative in the matter. Sales seem to be made only to recognized customers, and it may be that the casual buyer or one without regular mill connections will have difficulty in covering.

In the Chicago market, first quality bright tin plates, 1C, 14x20, are quoted at \$13.60 per box of 112 sheets and other gages and sizes at corresponding figures.

SHEETS.

There is not a great deal of activity in the sheet market, as a whole, by reason of the fact that so many mills are not willing to sell at the regular or March 21st prices. Transactions at higher prices are restricted by the unwillingness of buyers to pay premiums, while transactions at the basis prices are limited by the unwillingness of mills who make these prices to sell freely. If they took on all tonnage offered they would become sold up in a very short time, while their aim is to take care of the requirements of regular customers as far as possible, and not to let any tonnage go to buyers not their regular customers.

Production of sheets is heavy, as a total, and while there is talk of there being a continued scarcity, it is not at all easy to prove that there will be. The main difficulty is in pickled sheets and special sheets of other descriptions. Tremendous premiums are bid for some descriptions of sheets, up to \$40 a ton. The premium is for the finish, not for the basis sheet.

The leading interest is operating 93 per cent of its sheet mills this week, or approximately the proportion it would expect to operate in normal times, when there are breakages and difficulties of one sort or another, so that the strike may be said in this respect to be without effect, but there are after effects of the strike in tonnages per mill not being up to the mark in all cases. In point of number of mills operated the independents are not doing as well as the leading interests, but they are operating a considerably larger number of mills than before the strike.

OLD METALS.

Wholesale quotations in the Chicago district which may be considered nominal are as follows: Old steel axles, \$30.00 to \$31.00; old iron axles, \$32.50 to \$33.50; steel springs, \$21.50 to \$22.50; No. 1 wrought iron, \$22.50 to \$23.50; No. 1 cast, \$28.00 to \$29.00, all net tons. Prices for non-ferrous metals are as follows, per pound: Light copper, 13 cents; light brass, 7½ cents; lead, 5 cents; zinc, 5 cents; cast aluminum, 24½ cents.

PIG IRON.

In the Eastern iron market scarcity of available supplies is still cause for much concern, and the uncertain outlook for coal may aggravate the situation further. Foundry iron prices are advancing rapidly and \$38 for No. 2X and \$37 for No. 2 plain already has been obtained at an eastern Pennsylvania furnace for next year. Some furnaces even have refused to accept further business at this level. Several Eastern furnaces have sold more than three-fourths of their first half output.

Current Hardware and Metal Prices.

AMERICAN ARTISAN AND HARDWARE RECORD is the only publication containing Western Hardware and Metal prices corrected weekly.

| METALS. | | LEAD. | | Broad. | | BEATERS. | |
|--------------------------------|--|--|--|--|--|---|--|
| PIG IRON. | | American Pig.....\$7 25 | | Plumbs, West, Pat.....List | | Carpet. | |
| Basic.....\$25 50 | | Bar.....7 75 | | " Can. Pat.....\$69 00 | | No. 7 Tinned Spring Wire... \$1 10 | |
| Northern Fdy., No. 2.... 26 75 | | Sheet. | | Firemen's (handled). ..per doz. 21 00 | | No. 8 Spring Wire coppered... 1 50 | |
| Southern Fdy., No. 2.... 30 00 | | Full coils.....per 100 lbs. \$9 50 | | | | No. 9 Preston.....1 75 | |
| Lake Sup. Charcoal.... 31 45 | | Cut coils.....per 100 lbs. 9 75 | | | | Egg. | |
| Malleable.....27 25 | | TIN. | | Single Bitted (without handles). | | No. 50 Imp. Dover.....\$ 1 10 | |
| FIRST QUALITY BRIGHT | | Pig tin.....58c | | Prices | | No. 102 " " tinned... 1 35 | |
| TIN PLATES. | | Bar tin.....60c | | Warren Silver Steel.. on application | | No. 150 " " hotel... 2 10 | |
| | | HARDWARE. | | Warren Blue Finished. " | | No. 10 Heavy hotel tinned.. 2 10 | |
| | | ADZES. | | Matchless Red Pole.....\$11 50 | | No. 13 " " " 3 30 | |
| | | Carpenters'. | | Double Bitted (without handles). | | No. 15 " " " 3 60 | |
| | | Plumbs.....Net | | Warren's Natl. Blue, 3 1/2 to 4 1/2 | | No. 18 " " " 4 50 | |
| | | Coopers'. | | lb.....Prices on application | | Hand. | |
| | | Barton's.....Net | | The above prices on axes of 3 to 4 lbs. are the base prices. | | 8 9 10 12 | |
| | | White's.....Net | | BAGS, PAPER NAIL. | | Per doz.\$11 50 13 00 14 75 18 00 | |
| | | Railroad. | | Pounds.... 10 16 20 25 | | Moulders'. | |
| | | Plumbs.....Net | | Per 1,000...\$5 00 6 50 7 50 9 00 | | 12-inch.....Per doz. 20 00 | |
| | | AMMUNITION. | | BALANCES, SPRING. | | BELLS. | |
| | | Peters Cartridges. | | Pelouze.....20% | | 3-inch Nickeled Rotary Bell, | |
| | | Semi-Smokeless.....Less 10-7 1/2% | | BARS, CROW. | | Bronzed base.....per doz. \$5 50 | |
| | | Smokeless.....Less 10-7 1/2% | | Pinch or Wedge Point, per cwt....\$8 50 | | Cow. | |
| | | Shells, Loaded, Peters. | | BASKETS. | | Kentucky.....30% | |
| | | Loaded with Black Powder. Less 15% | | Small Willow.....per doz. 15 00 | | Door. | |
| | | Loaded with Smokeless Powder, medium grades.....Less 15% | | Medium Willow.....17 00 | | New Departure Automatic...\$ 7 50 | |
| | | Loaded with Smokeless Powder, high grade.....Less 15% | | Large Willow.....23 00 | | Rotary. | |
| | | Winchester. | | Galvanized Steel. 1/2 bu. 1 bu. 1 1/2 bu. | | 3 -in. Old Copper Bell.....6 00 | |
| | | Smokeless Repeater Grade. Less 15% | | Per doz.....\$11 50 \$17 00 \$22 00 | | 3 -in. Old Copper Bell, fancy. 8 00 | |
| | | Smokeless Leader Grade. Less 15% | | AUGERS | | 3 -in. Nickeled Steel Bell.....6 00 | |
| | | Black Powder.....Less 15% | | Boring Machine.....60% | | 3 1/2 -in. Nickeled Steel Bell.... 6 50 | |
| | | U. M. C. | | Irwin's.....25% | | Hand. | |
| | | Nitro Club.....10 1/2 5% | | Carpenter's Nut.....30% | | Hand Bells, polished.....15% | |
| | | Arrow.....10 1/2 5% | | Hollow. | | White Metal.....15% | |
| | | New Club.....10 1/2 5% | | Bonney's.....per doz. 30 00 | | Nickel Plated.....10% | |
| | | Gun Wads—per 1000. | | Stearns, No. 0.....43 25 | | Swiss.....15% | |
| | | Winchester 7-8 gauge.....10 1/2 7 1/2% | | " No. 1.....43 25 | | Silver Chime.....10% | |
| | | " 9-10 gauge.....10 1/2 7 1/2% | | " No. 2.....43 25 | | Miscellaneous. | |
| | | " 11-28 gauge.....10 1/2 7 1/2% | | " No. 3.....42 00 | | Church and School, steel alloys...30% | |
| | | Powder. | | " No. 4.....10 50 | | Farm, lbs... 40 50 75 100 | |
| | | DuPont's Sporting, kegs.....\$11 25 | | " No. 30.....45 00 | | Each.....\$3 00 3 75 5 50 7 25 | |
| | | " " 1/2 kegs.....3 10 | | " No. 33.....45 00 | | BEVELS, TEE | |
| | | DuPont's Canisters, 1-lb.....56 | | " No. 44.....17 00 | | Stanley's rosewood handle, new | |
| | | " Smokeless, drums.....43 50 | | " No. 50.....48 00 | | list.....Nets | |
| | | " " kegs.....22 00 | | " No. 55.....45 00 | | Stanley's iron handle.....Nets | |
| | | " " 1/2-kegs.....5 75 | | " No. 60.....42 00 | | BINDING CLOTH. | |
| | | " " canisters.....1 00 | | Post Hole. | | Zincd.....55% | |
| | | L. & R. Orange, Extra Sporting | | Iwan's Post Hole and Well.....30% | | Brass.....40% | |
| | | kegs.....11 25 | | Vaughan's, 4 to 9-in...per doz.\$ 14 00 | | Brass, plated.....60% | |
| | | L. & R. Orange, Extra Sporting | | Ship. | | BITS. | |
| | | 1/2-kegs.....5 90 | | Ford's, with or without screw, Net list | | Auger. | |
| | | L. & R. Orange, Extra Sporting | | Brad. | | No. 18 Wheeler's...per doz. \$2 25 | |
| | | 1/2-kegs.....3 10 | | No. 3 Handled.....per doz. \$0 65 | | No. 20 " " " 3 00 | |
| | | L. & R. Orange, Extra Sporting | | No. 1050 Handled.....1 40 | | American Snailhead.. " 1 75 | |
| | | 1-lb. canisters.....56 | | Shouldered, assorted 1 to 4, ..per gro. 4 00 | | " Rose " " 2 00 | |
| | | L. & R. Orange, Extra Sporting | | Patent asst'd. 1 to 4.....85 | | " Flat.....1 40 | |
| | | 1/2-lb. canisters.....32 | | Harness. | | Mahew's Flat.....1 60 | |
| | | L. & R. Orange, Extra Sporting | | Common.....1 05 | | " Snail.....1 90 | |
| | | 1/2-lb. canisters.....22 | | Patent.....1 00 | | Dowel. | |
| | | Hercules "E.C." and "Infallible" | | Shouldered.....1 60 | | Russell Jennings.....15% | |
| | | 50 can drums.....43 50 | | Patented.....75 | | Gimlet. | |
| | | Hercules "E. C." kegs.....22 50 | | Scratch. | | Standard Double Cut. | |
| | | Hercules "E. C." 1/2-kegs.....11 25 | | No. 1S, socket hand'd. per doz. 2 50 | | Doz. \$1 10—\$1 60 | |
| | | Hercules "Infallible," 25 can | | No. 344 Goodell-Pratt, ..List, less ..35-40% | | Countersink.....Doz. 1 80 | |
| | | drums.....22 00 | | No. 7 Stanley.....2 25 | | Reamer. | |
| | | Hercules "Infallible," 10 can | | AXES. | | Standard Square.....Doz. 2 50 | |
| | | drums.....9 00 | | Roy's Handled. | | American Octagon... 2 50 | |
| | | Hercules "E. C." 1/2-kegs.....5 75 | | Niagara.....12 50 | | Screw Driver. | |
| | | Hercules "E.C." and "Infallible" | | | | No. 1 Common.....40 | |
| | | canisters.....1 00 | | | | No. 26 Stanley.....75 | |
| | | Hercules W. A. .30 Cal. Rifle, | | | | | |
| | | canisters.....1 25 | | | | | |
| | | Hercules Lightning Rifle, | | | | | |
| | | canisters.....1 25 | | | | | |
| | | Hercules Sharpshooter Rifle, | | | | | |
| | | canisters.....1 25 | | | | | |
| | | Hercules Unique Rifle, canisters | | | | | |
| | | 1 50 | | | | | |
| | | Hercules Bullseye Revolver, | | | | | |
| | | canisters.....1 00 | | | | | |
| | | ANVILS. | | | | | |
| | | Trenton, 70 to 80 lbs.....9 1/2c per lb. | | | | | |
| | | Trenton, 81 to 150 lbs.....9 1/2c per lb. | | | | | |
| | | ASBESTOS. | | | | | |
| | | Board and Paper, up to 1/16" 17c per lb. | | | | | |
| | | Thicker.....18c per lb. | | | | | |
| | | COPPER. | | | | | |
| | | Copper Sheet, base.....28 1/2c | | | | | |